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Strategic city-regional planning in the shrinking region of Kotka-Hamina

Thesis submitted for examination for the degree of Master of Science in Technology.

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Abstract of master's thesis

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Abstract

Shrinking can be seen as a problem facing many cities currently and in the future. Shrinking means in general terms loosing population and in Finland the number of shrinking cities and areas will increase if the current trend of moving to large cities continues. Also Finland faces the problem that the entire population will no longer grow in a few decades. Shrinking is still to many a taboo.

This thesis is a case study of the Kotka-Hamina city-region strategic stage master plan, which is a master which was drafted by five municipalities in South-Eastern part of Finland. The city-region has experienced shrinking. This thesis tries to assess how the strategic stage master plan works with the situation and what is the goal of the master plan.

The thesis uses GIS-data, document analysis and interviews. The main GIS-data is statistical data of the area from 1990 to 2015 and includes data of population, work and commuting. The document analysis used the master plan documentation with annexes. Nine interviews were used in the master thesis, in which ten planners were interviewed. Also as part of the master thesis a literature review was conducted of strategic spatial planning and shrinking. Because the case study is set in Finland, the thesis also has as an annex a review of the Finnish land-use planning system.

The GIS-data formed a picture of what is happening in the city-region. These findings were then compared to the master plan's map and overall plan with other documentation to explain choices. These findings were then compared and analyzed with the interview data to understand what kind of decisions does the master plan make regarding the city-area. Finally the results of this data was then compared to international literature.

The master plan is growth oriented and is a tool for marketing. The master plan guides future land-use to denser areas and is enabling for industry. As a marketing tool the master plan is part of a larger project to get new companies and population to the city-region. The master plan can be said to be used as a strategic tool to guide towards a future that is perhaps in some parts uncertain.

Keywords Shrinking, strategic planning, city-region land-use planning, GIS

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Tiivistelmä

Kaupunkiseutujen taantuminen on nykyhetken ja tulevaisuuden ongelma monilla alueilla. Yleisesti taantumisella tarkoitetaan väkiluvun vähenemistä. Suomessa taantuvien kaupunkien ja alueiden määrä tulee todennäköisesti lisääntymään, jos nykyinen muuttotrendi kohti kaupunkeja jatkuu. Uusimpien väestöennusteiden mukaan Suomen väkiluku tulee kääntymään kokonaisuudessa laskuun. Taantuminen on monille kunnille vieläkin tabu.

Tämä diplomityö on tapaustutkimus Kotkan-Haminan kaupunkiseudun strategisesta vaiheyleiskaavasta, joka on Kymenlaaksossa yhteisesti laadittu viiden kunnan yleiskaava. Kotkan-Haminan kaupunkiseutu on kokenut taantumista ja tämä diplomityö pyrkii arvioimaan miten kyseinen strateginen vaiheyleiskaava toimii taantuvan alueen suunnittelussa ja mikä on yleiskaavan tavoite.

Diplomityössä on käytetty paikkatietoaineistoa, dokumenttianalyysiä ja haastatteluja kymmeneltä suunnitteluun osallistuneesta kaavoittajasta. Paikkatietoaineisto on tilastoaineistoa tutkimusalueesta vuosien 1990 ja 2015 väliltä, ja sisältää väestödataa, työpaikkatietoja ja työmatkatietoja. Dokumenttianalyysissä käytetään yleiskaavan aineistoja liitteineen. Diplomityöhön kuuluu myös kirjallisuuskatsaus strategisesta maankäytönsuunnittelusta ja taantumisesta. Koska tapaustutkimus on tehty Suomen kaavoitusjärjestelmässä, diplomityön liitteenä on Suomen kaavoitusjärjestelmän katsaus.

Paikkatietoaineistolla muodostettiin ymmärrys kaupunkiseudulla tapahtuneista muutoksista. Tämän jälkeen paikkatietoaineistoja verrattiin yleiskaavakarttaan ja kokonaissuunnitelmaan, muiden aineistojen kanssa, jolla pyrittiin ymmärtämään miten kaava reagoi tilanteeseen. Tämän seurauksena muodostunutta kuvaa verrattiin haastatteluista saatuihin tietoihin. Lopuksi empiiristä tietoa verrattiin kansainväliseen tutkimukseen.

Yleiskaava on kasvuun suuntautunut ja on yksi markkinoinnin työkaluista. Kaavaratkaisu ohjaa kasvua tiheämmille alueille, ja se on teollisuutta kohtaan mahdollistava. Yleiskaavan tarkoituksena on saada kaupunkiseudulle uusia työpaikkoja ja asukkaita, sekä olla strateginen työkalu, joka ohjaa alueen kehitystä kohti tulevaisuutta, joka on kenties osittain vielä tuntematon.

Avainsanat Taantuminen, strateginen suunnittelu, kaupunkiseutusuunnittelu, GIS

Preface

There is a saying in Finland *"Viimeinen sammuttaa valot"*, translated it means that the last to leave should turn of the lights. To me as a planner this has always been an interesting thought, we plan for growth, but what should be done when people move out of an area? How do we plan for shrinking? In my master's studies I realized in a lecture that there is research done in the field of shrinking. I was instantly fascinated and had to read everything about the topic.

This thesis has been a long journey, but at the same time extremely rewarding. I also find this topic very relevant to today's world, especially because shrinking will continue and in Finland more municipalities will face this change.

This thesis was founded by the Academy of Finland as part of the BEMINE project. Data used in this thesis was acquired from the Finnish Environment Institute.

I must thank from the bottom of my heart the small team at Aalto that was involved. Kaisa Granqvist, thank you for your company on the road trips, guidance and talks during this process. My advisor Alois Humer, thank you for the lecture that made me fascinated about shrinking and for all of your guidance. My supervisor Raine Mäntysalo, thank you for giving me the change to do research and for all of your wisdom.

I thank my family for making it possible to make it this far in my life. I would also like to thank my fellow SPT students, this journey with you has been great. I must also thank everyone that has worked with me as a planner, professional knowledge is silent knowledge and thank you for sharing it with me. Especially thank you Hannu, conversations with you have always been interesting, challenging and rewarding.

Lastly I thank you Annamari, without our support and motivation I would not be here.

Vantaa 16.09.2019

Janne Oittinen

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Abbreviation and terms

ERTS-TM35FIN	Geographic coordinate system used in Finland (EPSG:3067)
GIS	Geographic information system
LUBA	The Finnish Land Use and Building Act (132/1999, Maankäyttö- ja rakennuslaki, MRL)
LUBD	The Finnish Land Use and Building Decree (895/1999, Maankäyttö- ja rakennusasetus, MRA)
QGIS	Quantum GIS, free and open-source geographic information system
YKR	Monitoring System of Spatial Structure and Urban Form (Yhdyskuntarakenteen seurannan aineistot)
Fertility rate	The number of children women generally have during their lifetime.
Municipality/City	According to the Finnish municipal act (410/2015) a municipality can decide to call itself a city by its own decision. This is only a name and has no other legal consequences.

1 Introduction

Land-use planning is often about controlling and guiding growth. Also it could be noted that much of research related to land-use planning has been focused of growing areas and phenomenon related to growth. Legislation and the tools of planning are from a time-period when there was a need to control to growth of the cities. There is of course the other side of growth, shrinking. Reading research about land-use planning gives an idea why is land-use planning controlled and why this control is needed, but these same methods and tools are possibly not suitable for guiding shrinking. In many areas of Finland shrinking is a common phenomenon. Currently Finland's largest city-regions are growing and as a result of this some regions are losing population. (Puustinen, Mäntysalo, & Karppi, 2016, p. 8) Shrinking is a phenomenon that is affecting a growing number of cities and regions in Europe and in many other places globally (Haase, Rink, Grossmann, Bernt, & Mykhnenko, 2014; Wolff & Wiechmann, 2018). Shrinking is most commonly identified through population loss of an area (Großmann, Bontje, Haase, & Mykhnenko, 2013; Haase, Bernt, Großmann, Mykhnenko, & Rink, 2016; Hoekveld, 2014; Martinez-Fernandez, Audirac, Fol, & Cunningham-Sabot, 2012; Reckien & Martinez-Fernandez, 2011). Signs can be seen in Finland that the entire population of the country will start to decline, and currently some areas are experiencing shrinking already. Finland is also experiencing demographic changes on a national level and also population is migrating in certain parts of Finland like the largest cities. (Kautto, 2004a, pp. 26, 58; Tilastokeskus, 2018b)

As an interesting thought Rajaniemi (1997, p. 7) expresses shrinking as *"a direction in which development does not normally go towards to" (authors translation)*. I understand this thought and it might be also said that shrinking is a direction towards which development is not normally seen to go. Land-use planning has a bias towards growth. As a tool it can be seen suitable for dealing with growth and guiding its impacts. (Galster, 2019; Molotch, 1976; Popper & Popper, 2002; Rajaniemi, 2006) Shrinking on the other hand is a certain kind of taboo, it has a bad image for cities and municipalities, and they try to avoid it. Rajaniemi (1997) identifies this as something that perhaps can be seen as dying or disappearing. And this can be seen as a denial of shrinking or identifying it as a temporary phase in a municipality's development. The municipality loses parts of itself as it is losing jobs and inhabitants, what once was strong and growing is then weak and on a path of disappearing. (Rajaniemi, 1997)

The aim of this master's thesis is to study how strategic master planning works in a shrinking city-region. This question is explored, in the empirical part of this thesis, through a case study of Kotka-Hamina, a shrinking city-region in South-Eastern Finland, which has developed a strategic stage master plan. This thesis aims to analyze how the city-region is responding to a continuous loss or population and economic decline with its strategic stage master plan. Through GIS-analysis (figure 1), in which population, work and commuting data is used, the thesis aims to characterize the spatial patterns of shrinking in the city-region over time. The results of this are compared then to the final masterplan; to its main map, its accompanying report and some of the annexes. The strategic stage master plan is the most important source document of the analysis, but also other documents are analyzed. Furthermore, to understand the response of the masterplan to the experienced de-growth in the region, this thesis will utilize nine interviews with ten planners involved in the drafting of the strategic stage master plan. These interviews were conducted with other researchers. This was done as a case study within the Academy of Finland Bemine

project. The thesis uses GIS-analysis, interviews and a review of the planning documents to understand the situation in the city-region and how the city-region is responding to the situation via land-use planning in the form of a strategic stage master plan that is created in co-operation by five municipalities in the city-region. The city-regional strategic stage master plan is analyzed by using both the plan's map and the accompanying texts. This master's thesis tries to answer the following questions:

- How does city-regional strategic master planning guide land-use in the shrinking city-region of Kotka-Hamina?
- How do the decisions made in the master plan compare to the situation in the city-region?
- Is the selected planning tool capable of dealing with shrinking that the city-region has been faced with?

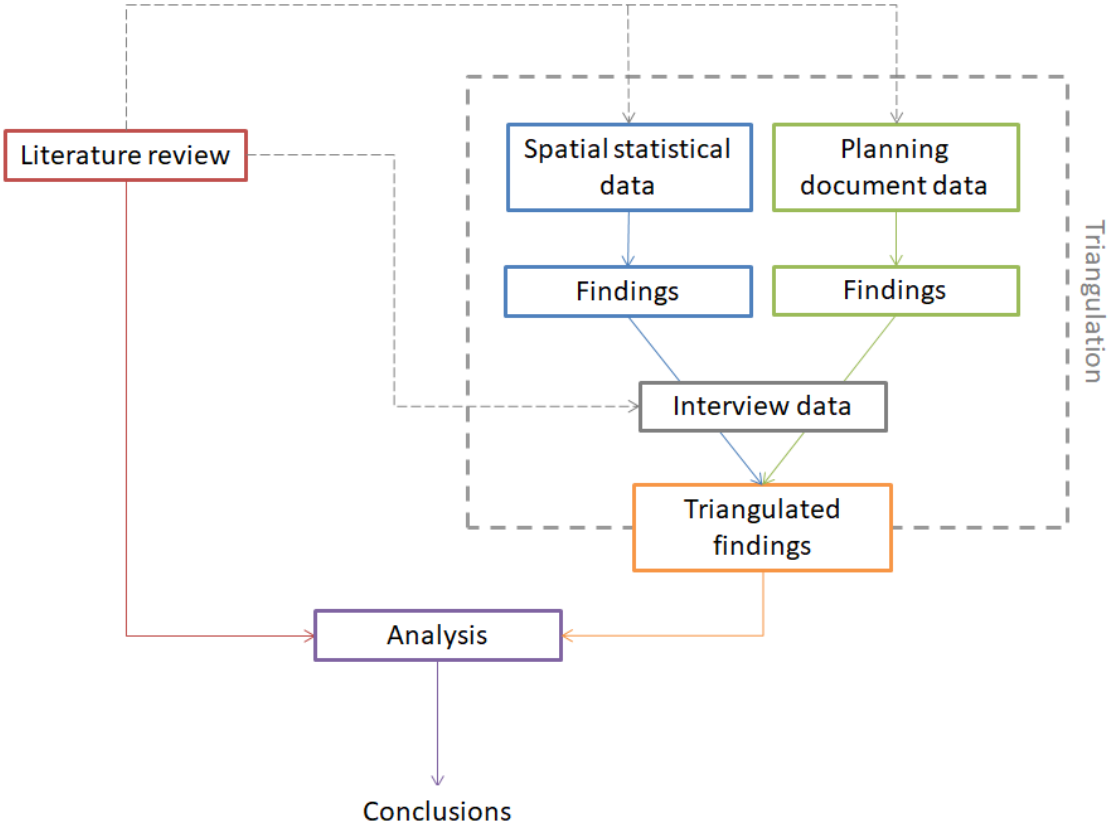

Figure 1. Basic structure of methodology for the thesis.

This master's thesis studies policy responses of city-regional spatial planning to shrinking, in Finland, when compared to a GIS-analysis. This sort of bridging is suggested by Großmann, Bontje, Haase and Mykhnenko (2013). Planning research of shrinking does not often study how spatial planning tools work in shrinking areas or how these tools are suitable for controlling or guiding shrinking. This master plan is used as a legal planning tool to respond to certain changes that the area is experiencing.

The Finnish planning system works on two levels, the municipal and the regional. The Kotka-Hamina city-region strategic stage master plan is at a municipal level as a land use planning instrument and it will be also approved at municipal level, but it aims to solve problems at a regional level. This requires the municipalities to voluntarily work together. This setting is vulnerable to political tensions as the municipalities in the area are uneven in terms of population, size and number of jobs, and this forces the municipalities to work together to distribute all of the possible gains. To make this possible the participating municipalities need to gain something and then assess are these benefits good enough for them. With this sort of collaboration a momentum can be produced, which might attract others to become interested in the area and this might then lead to the ideas of the plans to become reality. (Healey, 2009) Also this sort of strategic work creates bonds between the municipalities and actors, and in a way makes them work together for this future, even if there are conflicting views and agendas (Albrechts & Balducci, 2013; Van Den Broeck, 2013).

Strategic spatial planning does not currently have a legal position in in the Finnish land-use planning system (Ekroos, Katajamäki, Kinnunen, Lehtovuori, & Staffans, 2018, p. 68). Traditional land-use planning can be called project planning since as a form of planning it is very target oriented and precise, in a way painting a picture of the future in a very detailed way. Strategic planning differs from this project planning as it tries to picture a vision of the future, which is aimed at change. Strategic planning guides towards this vision of the future and tries to create change. At the same time it does not try to be comprehensive, it selects the aspects that it wants to affect to get to the desired future. There is a need for both of these types of plans and perhaps a hybrid that combines them both into a single legally guiding plan might be a solution. If strategic planning would be used as a tool outside of statutory planning, what would its legal position be? (Albrechts, 2004; Albrechts & Balducci, 2013; Faludi, 2000; Mäntysalo, 2013; Mäntysalo, Kangasoja, & Kanninen, 2014, 2015; Van Den Broeck, 2013) Humer (2018) notes that informal strategic planning tools have been used in rapidly growing areas, and that in general strategic land-use planning has not been used in shrinking cases.

Shrinking and the response to shrinking via city-region strategic master planning may not be solved on a local municipal level, but it is tried to be solved in this case in a city-regional level. To understand how the region is responding to shrinking, an analysis of the area is crucial. Analysis shows how the area is experiencing shrinking spatially and this is then compared to the strategic stage master plan, in order to understand how the plan will respond to the challenges facing the area. Großmann et al. (2013) call for "now need to be followed by more integrated, mixed-methods research, digging deeper into the local contexts and consequences of shrinkage."

2 Strategic spatial planning

A strategic master plan in Finland depicts decisions and it is visible also in its presentation. Usually these are represented very generally and it is not uncommon to use symbolic markings. A strategic master plan can be the first step in determining the land use of a municipality, after which the planning will be planned in more detail in other forms of plans. (Salmi, 2006, pp. 27–28, 52) In Finland master plans that were planned to be strategic lose their strategic element during the planning process. It is normal to see master plans as detailed reservation plans and that these plans have little room for interpretation that can be then guided towards more detailed plans. (Ympäristöministeriö, 2014, pp. 36–37)

Traditional institutional land-use planning can be very precise and these kinds of plans have a target that is very well predicted and this is then permitted to be built. These can be called project plans and they are in essence the picture of the future that is to be adopted in a certain time frame. (Faludi, 2000; Van Den Broeck, 2013) Strategic land use planning differs from traditional planning. Strategic land-use planning breaks away from traditional land-use planning methods, as it tries to approach problems that cities and regions are facing in a new way. This new way might address better challenges that these cities and regions are facing. The new way means selecting a vision, when in traditional land-use the emphasis has been in comprehensiveness, which can be seen as a weakness of it. Usually these traditional plans have to be changed to adapt to a different situation. Strategic planning is a way to complement the normal approaches with a more development oriented approach, which is aimed at change. (Albrechts & Balducci, 2013; Van Den Broeck, 2013) Van Den Broeck (2013) discusses that there is a need for both types of planning, but is it possible to have these both coexist? Traditional planning would be for legal aspects and strategic planning would be for spatial planning. (Van Den Broeck, 2013)

But then there is a problem with how should these two work together and that in some circumstances there might be an push to choose either but not use both mixed. If strategic planning would exist outside the institutional land-use planning system, legally this could be problematic. Could strategic elements be used in traditional institutional land-use planning? How would the legality of these strategic elements work with a statutory system? (Mäntysalo, 2013; Mäntysalo et al., 2015) Albrechts and Balducci (2013) describe some features of strategic planning in disP, and suggest that strategic land-use planning is not meant to replace traditional land-use planning. (Albrechts & Balducci, 2013) Mäntysalo, Kangasoja and Kanninen (2014) suggest that strategic land-use planning should not be only about the properties that are opposite to traditional land-use planning, it should also be about the usage of non-strategic planning tools. (Mäntysalo et al., 2014, p. 9) This means that the statutory land-use planning system which is commonly seen as non-strategic, should work with strategic aspects together to create at the same time what is required by the statutory system and with strategic elements. This creates complexity, meaning that this sort of planning should be non-strategic and strategic at the same time. (Mäntysalo et al., 2014, pp. 14–15)

Strategic planning is not trying to be comprehensive and solve everything, but rather it selects the aspects that it wants to affect to get to the desired future. The desired future is a goal, the selected vision that the plan guides towards. Not everything is solved, only the things that have to be addressed and these subjects that are to be addressed are to be actually done in order to get to the desired goal. Compared to traditional land-use in which

plans are often designed to react to problems or to create reactions to challenges, strategic land-use planning works to make change. (Albrechts, 2004; Albrechts & Balducci, 2013; Faludi, 2000) A problem with traditional planning is that these plans become outdated after a certain point of time and need to be redrawn to be implemented. (Van Den Broeck, 2013)

Also working together or coproduction, as Albrechts and Balducci (2013) call it, is needed. This way of working together and looking for common solutions creates bonds between actors and makes them need each other to make the desired future a reality. This should not be limited to only actors interested in working together, but also to working with actors that might have conflicting views and agendas. A certain level of conflict should be accepted as part of the process. (Albrechts & Balducci, 2013; Van Den Broeck, 2013) This process of planning should also include citizens, which might be seen as giving away power in the eyes of politicians, but citizens might have knowledge and the ability to affect the planning process. Through the planning process a common solution can be found. (Albrechts & Balducci, 2013) These spatial strategies may get many stakeholders involved and this means that they gain momentum. This momentum might then attract others to be interested in the area that might lead to the ideas of the plans to become reality. Related to this there is the question that is the process of creating a strategy worth it. This is a thing that changes throughout time and it cannot be easily predicted. It also means that how someone sees the benefits in the strategy and are these benefits good enough for them. (Healey, 2009)

Strategic spatial planning has to do with a number of different approaches, having no single right solution. There is a goal and how to get there can vary. Also these solutions differ because of the local conditions in which these methods are used. Implementation in another location means that the process takes into account the local conditions and adapts to the existing structure. Analysis of different plans and conditions and cases is needed. (Albrechts & Balducci, 2013; Van Den Broeck, 2013)

Strategic can be seen as an effort to change direction, to go towards new possibilities and to leave the previously used direction. In a way it means to depart from the current direction and to actively guide towards a new goal. (Healey, 2009; Van Den Broeck, 2013) The reasons behind using strategic planning differ, but the direction of planning is towards change and a vision. (Albrechts & Balducci, 2013)

Albrechts and Balducci (2013) describe that the strategic planning process should be dynamic in nature. Strategic planning should not be a static description of what is the problem faced nor should it not be a static vision of the future. Also strategic planning should be comfortable with the idea of uncertainty, meaning that the future might change and multiple futures are possible. (Albrechts & Balducci, 2013) Traditional planning tries to remove uncertainty. Legally this traditional planning gives legal stability, meaning that the legal aspects of a plan are stable and there is little room for interpretation. This makes the plan have little room for change, because the plan has been drawn so that a certain solution can be done. (Van Den Broeck, 2013) A progressive future should be accepted, where previously accepted and used methods might be assessed as something that needs to be rethought. (Albrechts & Balducci, 2013)

Spatial strategies may be expressed as maps or principles (Healey, 2009). But strategic planning is not a single solution or a way of working; it is numerous different tools and

concepts. (Albrechts & Balducci, 2013) But is then strategic spatial planning biased towards growth? Humer (2018, pp. 73, 76–77) points out that informal strategic planning tools have been used in rapidly growing areas, and that in general strategic spatial planning has not been used in shrinking cases. Thinking on a more general level Popper and Popper (2002) and Rajaniemi (2006) suggest that planning is aimed towards growth. This would then mean that strategic planning is also biased towards growth as a type of planning.

Humer (2018) suggests that formal statutory land-use planning is well suited for countering shrinkage or in other words for growth. On the other hand strategic spatial planning as a more proactive way of planning could be suited for guiding shrinkage. (Humer, 2018, pp. 80–81) Humer suggests that informal strategic planning tools could be better suited for spatial planning in shrinking areas. There are problems related to the informal side of planning such as participation, but this sort of planning could be used to break away from unrealistic planning. (Humer, 2018, pp. 73, 83)

2.1 Structural schemes

In Finland, Norway and Sweden informal strategic land-use planning instruments are becoming more common. These plans are used in between the levels of regional planning and master planning. (Mäntysalo et al., 2014, p. 12) In Finland the strategic spatial planning has been in a trend that it is detaching its self from institutional land-use planning. Structural schemes are being used as tools for city-region cooperation, but these structural schemes are not formal land-use planning instruments of the Finnish system. (Mäntysalo et al., 2015) In Finland the statuary system some time forces the master plans that are meant to be strategic to undergo a heavy planning process (Mäntysalo et al., 2014).

Structural schemes are in some cases seen as a solution for city-regional planning. Finnish regional plans can cover more than one city-region and master plans are usually aimed at municipal level land-use situations. (Mäntysalo et al., 2014, p. 21) The Land Use and Building Acts joint master plans have been seen as difficult to be drafted (Ympäristöministeriö, 2014, pp. 31, 34). Structural schemes are seen as easier to be used in planning for city-regions problems and these schemes are usually strategic by nature (Mäntysalo et al., 2014, pp. 21, 48). City-regions are facing problems like transportation and sprawl that transcend municipal borders. To answer these problems structural schemes have been used and these usually are created outside the formal land-use planning system and seen between the regional plan and the master plan. In some cases these structural plans have been created in Finland since the late 1960s and early 1970s. (Mäntysalo et al., 2014, p. 24)

In structural schemes problems are started to be solved on a city-regional level with the use of regional plans and with local municipal strategies (Mäntysalo et al., 2014, p. 24). It is common that regional plans and the processes differ in Finland. Usually a group of municipal officials guide a drafter of the structural scheme and different actors are involved through different workshops or commenting on the plan. The structural scheme differs from statutory plans as the requirements of land-use plans are not met, that are required of regional and master plans in Finland. (Mäntysalo et al., 2014, p. 27) The visual look of structural schemes is sometimes quite similar, because the structural schemes are drafted in Finland by a couple of consultant firms. In a study of ten structural schemes in Finland eight of ten were drafted by consultant firms. (Mäntysalo et al., 2014, p. 28)

2.2 Strategic planning in the reformed Finnish planning system

Currently there is no official decided structure of the future Land Use and Building Act. Some reports have been made about what the system should be in the future. The current Land Use and Building Act does not have a legal standing on strategic planning (Ekroos et al., 2018, p. 68).

The Ministry of the Environment, in a paper in 2018, suggests that there should be only two levels of planning. The higher level would be drafted on selected city-regions and this would be by nature a strategic plan. This would mean that planning would be transformed from a regional level planning to a city-region level planning that would not have in all cases legal consequences. This would mean that guidance of municipal planning in these selected city-regions would come from this sort of plan, which would convey regional and national interests to the municipalities of the city-region. This sort of plan would then guide decisions related to the areas' development and the paper states that the municipalities in the city-region would need to be committed to this sort of plan. Outside these city-regions only municipal planning would be needed. The plan itself would be by representation general as it is a strategic plan and it would present habitation, urban structure and transportation as a picture of what the city-region should strive towards. As optional also green areas and nature and culturally important areas of city-regional importance could be presented. The paper suggest that drafting this sort of plan would be mandatory in the city-regions of Helsinki, Tampere, Turku and Oulu, but also around ten other city-regions would benefit from this. (Ympäristöministeriö, 2018a)

Another report from 2018 for the Ministry of Environment states that in the future the renewed Land Use and Building Act should serve better different parts of Finland that have different needs (Ekroos et al., 2018, p. 24). This report also suggests that planning should have only two levels in the future. The higher level plans would be strategic and binding or non-binging depending on the authority. Higher level binding plans would be drafted by the municipalities only. Regions and city-regions would also create such plans, but as non-binding, and all these three types of plans, higher level binding municipal plans and non-binding regional and city-regional plans, would coexist parallel to each other. (Ekroos et al., 2018, pp. 34–35) But strategic plans could be created by municipalities, city-regions and regions. The difference would be that regional and city-regional plans would look at things at a larger scale and take into account national interests. (Ekroos et al., 2018, pp. 37–38) In a way this means that there could be three coexisting higher level plans working at the same time, but only the most accurate, the one drafted by a municipality, would have binding features. The report suggests that higher level planning would be a continual process, which would reflect on what has happened and what needs to happen. (Ekroos et al., 2018, pp. 34–35) The main idea is to reduce the levels of planning. The municipal level higher plan would be equivalent to the current master plan and it would have legal consequences, but the higher level plans drafted for regions and city-regions would be by nature strategic and would replace joint master plans and regional plans. This strategic plan would not guide plans or projects in a way that is binding. These plans would be drafted when needed flexibly. The updating of these plans is suggested to take place periodically, the strategic plans in a municipality would be updated when a new municipal council is selected and the legally binding ones should be also periodically updated. (Ekroos et al., 2018, pp. 36–37) At the city-regional level the plans would solve problems related to functionality and competitiveness of the city-region. While on the regional level the main goal would be to convey national interests to the more precise levels. This report also sees

that the largest city-regions would benefit from a mandatory city-regional planning instrument. (Ekroos et al., 2018, pp. 38–39)

Both of these reports are based on the idea of a regional government reform that would be in effect in 2021. But this reform was discontinued on 8th of March 2019. (Valtioneuvosto, 2019) It is unclear how this will affect the reform of the proposed land use and planning systems. Both reports have mentioned that this regional government reform will affect the planning system and that this has to be taken into account (Ekroos et al., 2018; Ympäristöministeriö, 2018a). And this is reflected in the reports. Now that the reform has been discontinued, these reports are partly outdated and it is unclear what the system will be in the future.

3 Urban and regional shrinking

Shrinking of cities and regions can be seen as a rather normal phenomenon in the developed world nowadays. (Wolff & Wiechmann, 2018) There are in literature many views on indicators of shrinking. The most commonly accepted indicator for shrinkage is population loss or demographic changes. (Großmann et al., 2013; Haase et al., 2016; Hoekveld, 2014; Martinez-Fernandez et al., 2012; Reckien & Martinez-Fernandez, 2011) Another indicator usually used is economic changes (Hoekveld, 2014; Hollander, Pallagst, Schwarz, Popper, & Hollander, 2009; Pallagst, Wiechmann, & Martinez-Fernandez, 2013; Reckien & Martinez-Fernandez, 2011). Population data is largely and easily available, so this makes it a good indicator of urban change. Population change is also linked to economic change, which is usually harder to acquire in long-term format. (Mykhnenko & Turok, 2008; Turok & Mykhnenko, 2007) There are two ways to look at population shrinkage, either absolute population changes i.e. meaning the percentage a city has lost of its population from 1990 to 2015. And then there is the rate of shrinkage, in which the annual change is looked at. The rate in which this change happens is important and this reveals possible shocks in the process. (Haase et al., 2016)

Terminologically the phenomenon of shrinking has been labelled with different names. The reason for this could be language constraints, but as a result of this, different countries have had research conducted somewhat separately, using different terms. Urban shrinking is commonly used and so is urban decline. (Großmann et al., 2013; Hoekveld, 2014; Martinez-Fernandez et al., 2012) Also terms like population shrinkage, shrinking cities and depopulation are used (Großmann et al., 2013; Hattori, Kaido, & Matsuyuki, 2017; Hollander et al., 2009; Reckien & Martinez-Fernandez, 2011). As an interesting term of shrinking, in the Japanese context they have used the term vanishing (Shometsu) sometimes (Hattori et al., 2017). The term of shrinking comes from the German context and it has been used from the beginning of the 21st century. Before that different terms like disurbanization and decline were used (Haase et al., 2014). As a term shrinking and the Japanese term vanishing imply that the trajectory is towards something smaller and perhaps even towards nothing (Hattori et al., 2017; Hollander et al., 2009). In Finnish context the word *taantuma* is often used. Roughly turned it means regression or downturn. Shrinking can be seen in towns, cities and regions (Reckien & Martinez-Fernandez, 2011) but also in rural areas (Popper & Popper, 2002). Also wars, climate change, natural disasters and political changes can cause shrinking, some of these like wars cause rapid population losses, compared to the usually experienced slow process (Großmann et al., 2013; Reckien & Martinez-Fernandez, 2011).

Urban shrinking happens in many different ways. The process differs even though the reasons leading to shrinking might be similar. (Großmann et al., 2013) Deindustrialization and loss of a specific economic driver are reasons and drivers for shrinking that are work-related. (Haase et al., 2016; Rink, Haase, Bernt, & Mykhnenko, 2010) Sprawl and suburbanization also affect shrinking and might be the reason for it, either in the case of housing or businesses locating away from the city core areas. Also changes in population structure can be seen as drivers. (Haase et al., 2016; Reckien & Martinez-Fernandez, 2011; Rink et al., 2010) The reasons and rate vary from location to location, but the symptoms are usually the same, the area is losing inhabitants, which affects land use and population structure. (Rink et al., 2010) The reasons usually come from many different cases, studies and locations, which mean that reasons for shrinking vary a lot. (Haase et al., 2014)

Shrinking as a phenomenon is complex and it involves several different processes, which are connected to each other and behave in a circular or feedback-driven way that might enforce the process further. Some sources see shrinking as a linear process, but this may be a too simplistic description of the phenomenon. The processes vary from location to location and the processes can be observed through analysis, but they cannot be explained in this descriptive way. Shrinking itself is a complex system that has multiple variables, in which certain changes happen after other variables have changed. (Haase et al., 2014; Hoekveld, 2012; Hollander, Hartt, Wiley, & Vavra, 2018) To understand the process of shrinking, an understanding is required in both temporal and spatial terms. The dependence between population change and economic changes are connected and might in a circular way cause reinforcement of each other. In this way for example population loss can be seen as an effect and cause of shrinking. In regions there are differences in shrinking processes in the municipalities that are located in the region, because of the differences of the characteristics of these municipalities. These processes also have differences temporally in regions and these changes affect the other municipalities within the region. (Hoekveld, 2012) As a system this process has many variables and lags between these variables and it can be influenced by outside factors. Outside factors can be for example massive immigration or globalization. (Hartt, 2018; Hoekveld, 2012; Martinez-Fernandez et al., 2012) To better understand and to have better responses to shrinking, analyses are needed. Data suitable for these kinds of analysis are currently largely available. (Hartt, 2018)

3.1 A global phenomenon

Shrinking in Europe is common, where about 40 percent of cities with over 200 000 inhabitants have lost population at some point in time since 1960, and even more common in Eastern Europe, where three out of four cities with over 200 000 inhabitants are experiencing population decrease. (Mykhnenko & Turok, 2008; Turok & Mykhnenko, 2007) Eastern Germany is experiencing population losses while Western Germany is experiencing population growth. If looking at municipalities in a wider scope than above 200 000 inhabitants, population losses are quite common and can be found all over Europe. (Wolff & Wiechmann, 2018) In Europe there is generally a connection between population development of a city and the development of the country in terms of economy and governance. The former socialist countries have had a different kind of economic development, before the fall of socialism, than the rest of Europe. Currently in Europe the population is no longer growing as fast as it has previously done. (Mykhnenko & Turok, 2008; Turok & Mykhnenko, 2007; Wolff & Wiechmann, 2018).

In some parts of Europe municipalities located within countries, away from the shores, have a pattern of losing population to nearby growing cities. Also on a European scale, shrinking becomes more common as the amount of inhabitants in a city increase, except in cities with over 500 000 inhabitants, these cities seem to be less affected by shrinking. (Wolff & Wiechmann, 2018) These larger cities in Europe seem to be able to regrow better than smaller cities. This might be because of the better service levels that larger cities can provide. Also universities and other higher education hubs attract people. The growth in these cities is causing increases in the amount of younger people and also in the number of households. (Florida, 2006; Kabisch & Haase, 2011) Shrinking is also happening in Japan, South Korea (Hattori et al., 2017; Joo & Seo, 2018) and in the United States (Popper & Popper, 2002; Wiechmann & Pallagst, 2012). It is expected that shrinking will not

disappear in the future and it might become more common if the current trends continue. (Haase et al., 2014)

In Eastern Europe, reasons behind shrinking include falling fertility rates and migration internationally. Also migrating inhabitants are usually of that age that they affect negatively the fertility rate of the area that they are leaving. (Mykhnenko & Turok, 2008) The Eastern European countries' outward migration was strengthened by the countries' joining the European Union in 2004 and 2007. (Wolff & Wiechmann, 2018) Post-socialist countries' economic changes have led to migration. The fall of the socialist system can be seen as a starting point for this change, or it can be seen also as a point, when the change already started begun to accelerate. (Haase et al., 2016; Hollander et al., 2009; Rink et al., 2010) Some of these Eastern European countries have later stabilized, or their population has even begun to grow back after the beginning of the 21st century. (Haase et al., 2016) Eastern Europe is losing inhabitants toward Western Europe, usually because of better opportunities to get employed and better living conditions. During the socialist age the cities that grew were usually cities that had state-sponsored companies located in them or they were administrative and urban centers. (Mykhnenko & Turok, 2008) Eastern Germany has experienced population loss because of job-related migration to western parts of Germany, and East Germany has also the lowest fertility rates in the world. (Haase et al., 2016) When fertility rates drop below the level of replacement, which is in the European Union 2.1, it causes population levels to decrease; then population needs to grow in other forms like in-migration or immigration. (Elo, Koskinen, & Puotiainen, 2000, pp. 7–8; Hoekveld, 2014)

In the United States, places that have experienced shrinking have not been able to attract jobs in the information and service based jobs that are usually the most growing employment sector in the United States. Detroit, Philadelphia and Baltimore are experiencing long-term population losses, New York has also experienced population loss but it is now growing. Also some regions in the United States are experiencing population losses like the Great Plains. Detroit is a well-known example of shrinking. The city was known for its automotive industry, but from 1950 to 1990 almost half of the city's population and a number of jobs were lost. (Popper & Popper, 2002) For some time now, Detroit has often been represented as a decaying city in the media. (Millington, 2013)

3.2 Situation in Finland

It is common in Finland that areas are experiencing losses in working aged population. The most recent population projection from 2018 predicts that the population of Finland will start to shrink. Reports from 2004 predicted that that around the year 2019-2020, the population of Finland will turn towards shrinking, but the more recent prediction from 2018 that the population will reach is maximum around the year 2035. Beginning in 2016 the current trend of population in Finland is that more people die in Finland than are born and the main reason that population is not already shrinking is immigration. (Kautto, 2004b, pp. 7, 12, 2004a, pp. 29, 41; Tilastokeskus, 2018b; Uudenmaan liitto, 2017, p. 52) Uusimaa region, which has the capital region of Finland, is growing in terms of working aged population, but the percentage of children is decreasing in the area. Also the region has one of the lowest fertility rates in Finland. (Kautto, 2004a, p. 17; Uudenmaan liitto, 2017, p. 52) Finland has been experiencing from 2010 a negative trend in fertility rates and currently the fertility rate is the lowest in Finland's history at 1.49 (Tilastokeskus, 2018b). Typically in Finland the fertility rates are lower in cities than in rural areas, but this also

reflects the fact that cities have more students and higher education inhabitants, that usually postpone having children until a later point at time. Rural areas have also higher amounts of men than women, because women are more likely to move than men, which again affects fertility rates negatively. These effects combined make these areas, which are losing population, have a grim future when looking at future predictions. By the year 2030 larger cities will continue growing and small cities will sustain their population, while rural and agricultural areas will continue to lose population. In percentages the most population will be lost in sparsely populated rural areas. (Kautto, 2004a, pp. 18–19, 26, 30)

In Finland after the Second World War the generations know as baby boomers were born, when this generation retires from the working, a large gap is born in the working population and logically thinking these people will grow older and eventually die. A demographic change has been happening for the past fifty to sixty years in Finland, during this time the population has grown, but at the same time the percentage of children has dropped and over 65 year olds have been growing and keeps on growing. (Kautto, 2004b, pp. 7, 11–12, 2004a, p. 36) Some regions in Finland have higher than 2.1 fertility rates, but this does not mean that the population would be growing. It is typical for these areas to have a high amount of young people moving out of the areas that are studying aged. In cities that have high amounts of students, usually the ones that are the largest cities in the country are able to keep the students after graduation, while in the smaller cities tend to lose these students more easily, but of course there are great varieties if looking for example at the field of study of the students. Young people move to ten to twenty city-regions in Finland, that usually have higher education schools. (Kautto, 2004a, pp. 17, 26, 58)

Immigration to Finland in the beginning of the 21st century represented nearly half of the population growth of Finland. The population that immigrates to Finland usually locates to the largest cities, especially to the Helsinki, Vantaa, Espoo and Kauniainen. Some of the population that immigrates to Finland is returning citizens, but also refugees are common as immigrants. (Kautto, 2004a, pp. 21–22) Moving to Finland has been more common than moving from Finland since 1990, before that Finns typically moved abroad in hopes for a better life. Before the 1990s most of the immigration was people moving back to Finland, but around this time the number of non-native people moving to Finland started to increase. Where these people come from varies greatly from year to year, but certain events like wars and Eastern European countries joining the European Union create flows of people towards Finland. The number of people immigrating to Finland has been rising almost constantly and most of the immigrants are foreign citizens. Predictions suggest that the number of non-native immigrates will increase in the future. (Myrskylä & Pyykkönen, 2014, pp. 6, 8–10) Immigrants tend to have a higher fertility rates, but this does not usually make a great effect on the population. (Kautto, 2004a, p. 22) Immigrants also tend to be young adults, who might help with the demographic change that Finland is experiencing, it will not fully stop the change but it can affect it. (Myrskylä & Pyykkönen, 2014, pp. 14, 43–44)

3.3 Reasons

On a larger scale, globalization is in some cases said to be a reason for shrinkage. Globalization is affecting the population of cities and production locations of goods which causes people to move. This then causes the phenomenon that some areas are losing people while other areas are gaining population. (Martinez-Fernandez et al., 2012) Spatial

mismatches are seen as situations where demand and supply do not match spatially; these mismatches can concern housing, people and jobs. A solution for this might be to look at either what the area can offer already, or then to create or acquire what is needed. To counter these mismatches a higher level authority is needed to operate in these areas to support these areas' attempts for revitalization. (Reckien & Martinez-Fernandez, 2011)

Shrinking patterns differ inside regions. Some municipalities experience population loss quicker and more extensively than others inside a region. Inside these shrinking regions local factors contribute to these differences and also regional and national factors have an influence. To better understand the situation affecting an area a longer historical analysis is needed. The time span for such analysis might be as long as a century. (Hoekveld & Bontje, 2016) Each region typically has its own way to shrink and it might be affected by location, fertility, population structure and politics. Municipalities within these regions have differences and the pattern in which migration happens inside these regions is important to understand. (Hoekveld, 2012; Hoekveld & Bontje, 2016) Hoekveld (2012) argues that municipalities with good connectivity to neighboring municipalities, and which either have good employment opportunities themselves or then connectivity to the neighboring municipalities offering employment, have better chances in avoiding shrinking. So, the neighboring municipalities affect each other, and a single municipality cannot be solely studied in isolation when figuring out what needs to be done to reduce shrinking. (Hoekveld, 2012)

Shrinking patterns also vary inside cities, and usually areas that are described as inner-city areas are experiencing the most visible shrinking. (Haase et al., 2016; Rink et al., 2010) Shrinking can happen so that it affects certain parts of the city more than others, and then there is also a difference with how fast the process of shrinking happens. (Haase et al., 2016) Sprawl as a phenomenon is common in North America and Western Europe. Sprawl in some cases causes problems to municipalities because the inhabitants use for example infrastructure of the municipality in which they live, but at the same time they might travel to cities for shopping and working. In a way these inhabitants spend more money elsewhere than in their own municipalities. (Rink et al., 2010) Sprawl can also be seen in shrinking cities, as inhabitants move out from the city centers. In North America cities sprawl while the cities are experiencing shrinking, this sprawl is usually caused by suburbanization. (Großmann et al., 2013) For example in Daegu in South Korea, the population of the city stopped growing and at the same time the economy did not develop, but the city continued to grow in its footprint (Joo & Seo, 2018). In Europe in the last 80 years, people who had a better income level moved to the suburbs, perhaps to find large housing and to have more green near them. As a result population is lost in the inner areas of the city. But at the same time sprawling can cause shrinking, but shrinking can cause sprawl. (Reckien, 2007, p. 38; Reckien & Martinez-Fernandez, 2011).

3.4 Consequences

As a result of losing population, the area might experience multiple different impacts. The consequences might be either direct or indirect. Direct consequences being those that come directly from the area losing inhabitants or after losing jobs, like housing vacancies and brownfield areas. Indirect consequences being those that are produced from feedback loops. If thinking about direct causes, in some cases the infrastructure designed for a larger population experiences loss of users, car usage might rise because low usage of public transportation, schools might close, some services see decline, tax revenues decline, and

there might be a rising need for elderly services. Properties lose value and rents fall, there might be a decline in housing generally, old factory areas are left unused and vacant land areas and real estate properties appear. (Großmann et al., 2013; Haase et al., 2016; Hollander et al., 2009; Rink et al., 2010) In some cases, demolishing vacant apartment buildings is a possibility. This has happened in Eastern Germany and for example in Liverpool, this then balances the possible oversupply of vacant housing. Also in these areas that have a lower demand for housing, the lowering of costs might actually cause low-income households to move in. The aspect of demographic change related to shrinkage might actually increase the amount of inhabited areas, but with a decreased population density. In some areas the population is getting older and the number of inhabitants in a household decreases, meaning that there are fewer people living in apartments designed for larger households, generally implying lower population densities. Demographic changes are a combination of the number of deaths, births, migration in and out and immigration in and out. In some cases, deindustrialization has had a positive effect, as pollution levels have dropped and as a result of that the environment is improving. (Haase et al., 2016; Kautto, 2004a; Rink et al., 2010) Brain-drain is also seen in many cities as a effect of shrinking. This means that people that are well-educated, perhaps better income and younger, people are moving out. This leaves the remaining population unbalanced. (Cortese, Haase, Grossmann, & Ticha, 2014; Galster, 2019; Joo & Seo, 2018; Rink et al., 2010)

In cities that have experienced shrinking, shrinkage has had social impacts like ageing and segregation. Some areas might experience a growing number of unemployed low-income people. In shrinking cities these problems might be larger and more dynamic than with non-shrinking cities, and shrinking cities might also have fewer resources to tackle these problems. In some cities there are policy responses to shrinking, but the problem of shrinking must be first acknowledged, and these responses might not work as well as planned. These responses are more important in these shrinking cities than in growing cities, because these problems caused by shrinking are rapid and enforce the already present social problems of the area. The responses should also acknowledge the complexity of problems, and not just focus on selected problems like ageing. But the effects that happen in shrinking cities do also appear in growing cities, but on larger and dynamic scales. (Cortese et al., 2014) Shrinking can happen in only parts of a city. This means that responses might be needed in growing cities also. Segregation and sprawl are just two phenomena that can happen in growing and shrinking cities. In both cases these phenomena need to be addressed. (Cortese et al., 2014; Martinez-Fernandez et al., 2012) To prevent these outcomes, these certain land-use related phenomena should be handled before they happen or gain momentum to turn to the worst. Of course avoiding shrinkage could be impossible.

3.5 Responses

Popper and Popper (2002) suggest that “Planning has always had a bias towards growth.” They suggest that planning and its orders and documents are designed for guiding population growth, new buildings and the effects that these create. (Popper & Popper, 2002) Molotch (1976) also argues that growth is a vision that cities have and that population rise in urban areas is an indicator of success in this growth. Growth is often an indicator of success, when observing cities and growth is a part of a cities normal life at one point or another and as such continual growth can be seen as a state that cities strive towards. Planning is a tool that can be used to make these visions of growth to reality. In

Finland the planning system has been aimed towards growth. (Rajaniemi, 2006, pp. 150, 182–184) This growth is very apparent in the 1960s and 1970s, when the Finnish suburban housing estate areas were built, in which large amounts of apartment houses were built. These areas were built at a time when growth was the main goal and thus planning was used as a means to create growth. (Hankonen, 1994, pp. 469–470, 477) If using Molotch's (1976), Popper and Popper's (2002), Rajaniemi's (2006) and Galster's (2019) notes one could come to the conclusion that planning is meant for growth. This could be also understood that all planning including strategic planning is bias towards growth and that these planning tools would perhaps not work in the situation of shrinking.

It is written in the Finnish Land Use and Building Act 51 §, that the need for housing and the promotion of active competition in industry should be acknowledged when the need for land use is evaluated. Land use evaluation is part of the detailed plan's evaluation on whether it is up to date and at the same time it requires that detail planning is needed to be kept up to date as required by the development of the municipality. This is the only level of planning in the Finnish system that addresses this. (LUBA, 1999, 51 §) The National land use guidelines convey matters of national importance to regional and municipal planning and also to the actions of national authorities. The objectives of the first theme of the National land use guidelines are about functional communities and sustainable transport. In the themes explanatory part terms as: to better Finland's competitiveness, areas and communities evolve vitally, industries renewal and progress, are used to describe what is a goal to which to strive. (Valtioneuvosto, 2017) This all could be understood so that vitality and growth is promoted in the legal system, but the land-use planning system does not promote and give ordinances for shrinking.

Shrinking itself can be seen as losing or loss, losing population might be seen as failing in when striving towards a better future. And this hits in a hard place, a society that has been build can eventually fall. (Rajaniemi, 1997, pp. 6–7, 110–111) Shrinking is a difficult and controversial topic, but it should be acknowledged. (Popper & Popper, 2002) But shrinking might not be the opposite of growth, at least as a process. For example when a city is growing new infrastructure might be built to accommodate the growth, but it is not as simple in shrinking cities. Infrastructure might not be demolished or right-sized as a result of shrinking, it probably would remain designed for a higher population. (Galster, 2019) Most planning methods and tools are not designed for paradigm changes, like from growth to shrinking (Sousa & Pinho, 2015). Galster (2019) argues that the conventional planning tools and methods can do little to stop actual physical decay and abandonment (Galster, 2019). Shrinking areas have the potential to be transformed, old unused buildings and areas can be transformed to something new through re-planning. (Reckien & Martinez-Fernandez, 2011) Shrinking areas do require planning, planning in shrinking areas might need decisions about what services are needed and not needed. It may also require accepting that there is no growth in sight. (Kempenaar, van Lierop, Westerink, van der Valk, & van den Brink, 2016; Popper & Popper, 2002) Planners may need to change their attitude towards shrinking to better cope with it, planners normally do not know how to react to shrinking (Hollander et al., 2009; Kempenaar et al., 2016). Currently there is no definite solution to how planning should respond to shrinking and how planning is changing to take into account shrinking. There are some examples of cities that have accepted shrinking and are planning to reuse of underused areas. (Pallagst, Fleschurz, & Said, 2017) Rink et al. (2010) discuss that restructuring of labor markets has in some countries enabled the younger and better educated workforce to get jobs, when the

restructuring has happened from traditional Fordist industry towards for example IT or service sectors. As a side effect, the older age groups have experienced unemployment. Hoekveld and Bontje (2016) argue that the reasons why some people stay are as interesting as the reasons why some people leave. They also argue that the reasons might be quite similar as in growing areas.

Wolff and Wiechmann (2018) observed that economic changes do not mean that population will always follow the same pattern, meaning that economic growth can happen when population is declining and economic downfall can happen while the population is growing. (Wolff & Wiechmann, 2018) Audirac, Fol & Martinez-Fernandez (2010) conclude that growth strategies used in shrinking areas are not working and the same is expressed by Hollander et al. (2009). Planning should be directed towards development, not only for growth or shrinking (Sousa & Pinho, 2015). Planners do often use growth-oriented strategies in areas that are experiencing shrinking. (Knoop, 2014; Schatz, 2017) Hospers (2014) suggests that responses to shrinking can be categorized into four strategies: trivializing, countering, accepting and utilizing. The first means that nothing is done and perhaps data that shows a trend of shrinking is trivialized. Second is countering, in which the responses are typically towards growth. This is seen as a common solution in which the area must grow. The third, accepting, involves accepting that the area is shrinking. This might involve how to retain inhabitants or how to manage what is happening. The last is utilizing, in which the phenomenon is utilized for the benefit of the area. Shrinking does not mean in this case a bad life, the quality of life can be made to improve by various methods. (Hospers, 2014)

The Finnish government can declare a certain area as an abrupt structural change area after a large-scale termination of jobs in the area. Usually the amount of unemployment rises in these areas dramatically. The Finnish Ministry of Economic Affairs and Employment has developed a policy model for these areas in 2006, and the procedures are usually active for two to three years, but they can take longer if the area in question has new major abrupt structural changes taking place. The local municipalities, companies, Centers for Economic Development, Transport and the Environment and the regional development company work together to create new jobs to replace the terminated ones. The actions differ from area to area, but the basic principles are the same. (Felin & Mella, 2013, pp. 5–6, 10)

Also some sectors of industry can be declared to have abrupt structural changes. The areas affected by abrupt structural changes are usually given funding by the government, and usually the most affected include the classic industry fields like forest and pulp industry, which has experienced a large scale restructuration in Finland. Usually the areas affected are successfully supported but in some areas employment has risen to a much higher level than it originally was. Areas that have only a few major companies which are then closed are among the most complicated and vulnerable ones among the areas that are affected by abrupt structural changes. (Felin & Mella, 2013, pp. 2, 10, 24)

4 Methodology

The basic methodology and structure of the master's thesis is explained in figure 1 in the introduction chapter. As the theoretical part of the master's thesis a literature review was conducted on the topics of shrinking, strategic spatial planning and the Finnish planning system. The literature review is used to get an understanding of the theoretical aspects that are necessary for the thesis. The literature is also used later on to reflect the shrinking route that the city-region has gone through and to also compare the master plan with the literature to understand the strategic choices that are made and how the plan reacts to shrinking.

As the literature review on shrinking makes quite clear it is mostly studied with case studies. The literature review also shows the theoretical side of the literature, but most of the papers study certain areas. For this master's thesis a case study is the logical choice, because the case study represents a joint municipal strategic stage master plan in a shrinking city-region, which is a an interesting choice in many aspects.

The author is a practicing planner in Finland and this has an effect on this research. As Eräranta (2019) in her dissertation's prologue acknowledges, planning is at first complex for a new planner and that knowledge is stored in people, not documents. It takes time to understand the process of planning and it is not written in any book. (Eräranta, 2019, pp. 1–4) This has to be experienced firsthand to be understood. The author of this master's thesis agrees with this view of planning. For a practicing planner there is certain knowledge that is learned through work, an understanding of the system is one such. This understanding can be turned into an investigative mode to explore other plans and documentation, to understand why certain things were done. This knowledge has been used in the research of this thesis.

As tools for the analysis GIS-analysis QGIS and Microsoft Excel were used. These programs were also used to visualize the data and create the maps for the thesis. The strategic stage master plan was compared to the GIS-analysis data with layered images in Adobe Photoshop.

4.1 Case study

A case study normally encompasses several methods of study. (Laine, Bamberg, & Jokinen, 2007, p. 9) Case studies can be described as narrow and deep studies of a certain situation, where the amount of the observed cases is small, often just one. The use of a case study should be in line with the researcher's questions and also with what is wanted to be studied. (Flyvbjerg, 2006; Häikiö & Niemenmaa, 2007, p. 49; Laine et al., 2007, p. 9) The main objective of a case study is to understand how and why a certain phenomenon has developed. (Laine et al., 2007, p. 10) It is common in case studies that the theoretical background has to be built by the researcher and that this theory can shape the way that the case study is approached. (Häikiö & Niemenmaa, 2007, p. 51) Usually defining and limiting the case study is one of the most challenging phases, because a case study can be viewed from multiple different perspectives. It is important to clearly define what it is that is researched in the case study. Also the material is an important part of the definition, the materials can get too large if the researcher tries to understand the case in a too accurate and wide detail. (Häikiö & Niemenmaa, 2007, pp. 49–50; Malmsten, 2007, p. 57)

A case study should not be summarized. According to Flyvbjerg (2006), it should be kept open and let anyone enter the case study in all of its complexity. A case study should also be, according to Flyvbjerg, a way in which the readers find their own path and conclusions inside the case. In this vein Flyvbjerg (2006, p. 238) states: "The case story is itself the result". (Flyvbjerg, 2006) A case study tries to study a phenomenon as a complete event, to understand it as a whole. (Häikiö & Niemenmaa, 2007, p. 42)

Flyvbjerg (2006) argues that case studies are an important tool for research and that this skill should be practiced, but also this keeps the researcher near the reality of life. Häikiö and Niemenmaa (2007, p. 41) remind that choices made by the researcher affect the case study, even the selection of the case itself is a choice. The research process is affected by a number of things, including earlier research and what is a hot topic currently in research. (Häikiö & Niemenmaa, 2007, p. 45) The level in which the case is understood depends on the researcher's position in relation to the case. If the researcher has been part in creating the case that is studied, the understanding of the case is greater than in a case in which the researcher is an outsider. Also the researcher's own perspectives affect the study. (Häikiö & Niemenmaa, 2007, pp. 54–55)

4.2 Document analysis

Document analysis means going through documentation and analyzing the contents of these documents. A documentation analysis can be used both in qualitative and quantitative research and it can be used to complement other research methods or it can be used as the sole method of research. Currently documentation is produced daily by various instances for different purposes. These purposes of the documents are usually related to the producer, meaning that the reason for the document is not to be studied, but something else. It is not only institutions that produce documents, also regular people produce documentation daily in the form of photographs, letters etc. Other forms of documents that can be used in document analysis include minutes of meetings, maps, survey data and newspapers. These documents may not be originally meant to be used in scientific research, but these documents and the information they carry can be used for research. (Bowen, 2009; Flick, 2010, pp. 255, 257) Bowen (2009) also mentions that literature that is reviewed in studies and reports by researchers is often left out of the analyzed documents lists, but this should possibly be included as these are a source of data.

Documents usually have a purpose, a producer and a user. When making document analysis these facts should be kept in mind, because the document is a tool for communication. The document is also produced at a certain time of history and because of that it is affected by historical conditions. (Flick, 2010, p. 257) Documentation might be limited on a certain topic, this might cause that only certain viewpoints can be used. The limitations might be because of destruction of documents, level of secrecy and language. It is important to understand the limitations of documentation and the fact that something has quite probably been left out. A document analysis is more than a study of the document, one should understand the multiple aspects that are connected to the document and its creation, but at the same time the document analysis shows only a certain reality. This reality should be viewed with a critical eye. (Bowen, 2009; Flick, 2010, pp. 259–261)

4.3 Triangulation

Triangulation as described by Flick (2011, 2014) was selected as a research method. Triangulation as a concept is a method in which different methods are combined to

research a certain issue from different perspectives. This means that in research several different types of data can be combined or several different methods can be used. Triangulation possibly provides more knowledge than could be produced using a single approach. Triangulation can also be used to combine quantitative and qualitative methods. (Flick, 2011, pp. 186–187, 2014, pp. 182–184) Using triangulation usually implies the need of additional resources because of the use of several methods. These resources usually mean that more time is needed and possibly more costs for the research project. (Flick, 2014, p. 186) Triangulation is used in case studies, often to make complexity more understandable. (Laine et al., 2007, p. 23)

This set of methods was chosen because an understanding of what has happened previously is needed to understand how the master plan is responding. The method was also chosen because of the limited time and resources that are required of a master thesis, any broader method or adding additional methods to the methods would exceed the scope of a single master's thesis. The chosen method is limited to the data that is used, it can in no way explain for example why certain decisions were made, but it shows what is seen as a response that is accepted by the city-region facing shrinking.

The method does not for instance tell decisions by leaving inhabitants or it does not show why the area is losing jobs. The decisions made by the inhabitants and companies would help to understand why the area losing both, but this is would require a different kind of analysis. Also the chosen method does not illustrate what happened first, what triggered the shrinking, why did the growth of the area stop. Methods which are used by Hoekveld (2012) and Hartt (2018) are more suitable for this kind of analysis.

4.4 GIS-data

The analysis was made using GIS-data provided by the Finnish Environment Institute. The data is spatial data and it is called the Monitoring System of Spatial Structure and Urban Form (*Yhdyskuntarakenteen seurannan aineistot, YKR*). Depending on the datatype, data is largely available from 1990 onwards, but some data date back to 1980. The data is in a grid format in which the grid size is 250 x 250 m and the data's coordinate reference system is ETRS-TM35FIN. The actual data is in point format, but it represents the center point of the grid. The data is meant to be used for periodical analysis of changes in urban structure. (Suomen ympäristökeskus, 2016; Suomen ympäristökeskus & Tilastokeskus, 2016)

The data that was used for the analysis was population, workplace and commute grid data. All data types were of the years 1990, 1995, 2000, 2005, 2010 and 2015, population data was also available from the year 2016. Because of the five year intervals in data, a thorough analysis cannot be done, in which a change in one variable is observed on how it affects the other variables.

Population data has the total amount of population living permanently in the grid and also the sex and age group of the population. The data is point data and the data covers the entire study area of the five municipalities.

The workplace data has the amount of workplaces in the grid and it is point data. The workplace data has the total amount of workplaces in the grid and the data also has the amount of workplaces split into different sectors. As with population data the data covers the entire five municipality area.

The commute grid data is data that has two points, a starting point or habitation point and the point of work location. Because the data has two points the data is linear by type. The commute data has also data outside of the study area, because some of the trips start or end outside of the study area. The data also has unknown coordinates as starting or and ending points, these points were deleted from the material because it cannot be used in the analyses. The commute data is represented in direct lines, so the actual distance travelled from habitation to work is actually longer than the straight line that the data gives.

The population and workplace data covers the entire Kymenlaakso region. Data of commutes was available that had the starting point or ending point in Kymenlaakso. For the analysis the population and workplace data was cut to include only the grid data inside the study area. On grids on the borders of the study area, the grids that have the municipal code of one of the five municipalities inside the area where selected, grids that have a municipal code outside the study area were deleted. The population data was used to make spatial and statistical analysis of population change in the study area. The workplace data was used to observe changes in the amount of working places in the study area. The commuting data was used to evaluate the connection between working places and population changes.

The data was assessed in cycles of five years. In the case of the population changes, these are assessed in cycles of growth, shrinking and no change. If the population of the grid grows by even one inhabitant the grid is marked as having experienced a cycle of growth, also the same categorization applies for shrinking. The same method was also used for workplace data.

4.4.1 Limitations with the GIS-data

In some grids the amounts of workplaces move from grid to grid. Example in the case of Kymenlaakso Central Hospital in Kotka, the workplaces have shifted and this creates results that cause growth and degrowth of working places in nearby grids. The workplace data has also some problems with companies that have multiple offices in different locations. In some of these cases the workers can be marked in the main office of the company, which might skew the reliability of the data. Also part-time workers and seasonal workers are counted in these worker numbers. (Suomen ympäristökeskus & Tilastokeskus, 2016, p. 30) The population data has also similar problems. The population of a grid is registered to the grid that according to the official permanent residence of the person. This means that a person might actually live in Kotka in a second home, but has his official address in some other municipality in Finland like Tampere. (Suomen ympäristökeskus & Tilastokeskus, 2016, p. 37) The data is in a grid format meaning that it is good to use with coordinate systems and GIS-software, but there are some disadvantages. A grid format is not as good for example hexagon when examining nearest neighbor and balancing the average of the grid. The best shape would be a circle, but this would be hard to apply in a GIS-software, so a hexagon is closer in shape to a circle than a square and hexagons can be used in GIS-systems. (Birch, Oom, & Beecham, 2007; Elsner, Hodges, & Jagger, 2012) Because the data is in a grid format it would be difficult to make the data into a hexagon format, so this thesis is done using the grid data.

YKR-data is by nature sensitive data. The data could be misused to get sensitive data of individual people. As a result data that is used and represented must be done so that it

cannot be used to identify individual persons. Also this is reflected to for example visualizations of data, where classifications should be in the form of 1 to 10 or similar, to avoid possibilities of identification. Also when using the YKR-data the dataset should be large enough to avoid sensitive data to be displayed in too detail. (Suomen ympäristökeskus & Tilastokeskus, 2016, pp. 4–5)

4.4.2 GIS-processing

The YKR-data was first reviewed in Excel to remove municipalities that did not belong in the master plan's area. This was done to all three datasets. In the preliminary process the data cleared using municipal codes. After this process the data was started to be combined into larger datasets. The data was originally split to a few files that had all of the data mixed in a single sheet, data of a single grid existed on several rows and this could have caused problems in the GIS-software. This data was then organized into the three larger datasets: work, population and commute. Then this data was in an individual dataset split into sets that contained only data of a single year. The data was then reordered so that a single row had data of all of the years separated into individual columns. This data was then imported to QGIS. In QGIS the data that is actually point type data was converted into grid-data. The grid was generated using the data's X- and Y-coordinates as the center point for the grids. This process was done for the work and population data. The commute data is slightly different as it can be understood as line type data, as it has a start and an end point in the data. This data was imported into QGIS as line type data because it can be visualized as a line. The GIS-data was visualized using different types of thematic maps. The data was also studied extensively in Excel to see changes and to analyze the data statistically.

From every municipality five of the grids that have experienced the most population growth and population decrease were selected. The differences were then compared by age groups and gender in 1990 and 2015. A similar analysis was conducted on work data. In work data the differences were viewed by sectors of work. The work data was also analyzed individually by sectors of work to see if patterns of shrinking differentiate spatially from sector to sector. Both the work and population data was also viewed for signs of sprawling or shrinking spatially. Both visual analysis and statistical analysis are used to analyze the data.

4.5 Uncertainties

There are related to the GIS-analysis some uncertainties related to the data that are discussed earlier, but there are other uncertainties like calculation errors. In a few grids the data exists as two overlapping grids, this is because these grids are located in the border of municipalities and the size of the grids makes it possible that people of two different municipalities live in the same grid, which are then calculated into individual grids, depending on the municipalities that is inhabited, that overlap each other. The massive amount of data causes also uncertainties, as data amounts grow the possibility for errors increases.

Also the data was analyzed in cycles of five years, which causes more uncertainties. For example the population in a five year period might fluctuate and this would go unnoticed and spikes in the number of jobs go unnoticed too. Because of the five year interval sudden changes disappear and the actual moment when the actual change happens is lost. A massive loss of jobs might be understood better if more accurate data was available. YKR-data that is used for this thesis has much more data groups than the three that are used for

this thesis, these data groups revealed something different in the city-region that goes unnoticed currently. Also YKR-data related to working has changed its categorization between 2005 and 2010. In earlier data there are 18 categories of industry, in later data there are 22 categories of industry. This has caused in some cases movement of jobs from one category to another. Because of this certain industries in the analysis phase have to be interpreted to be certain earlier categories and this causes uncertainties to the analysis.

It is unknown to the author is there is a possibility that a group of people might be left out of the analysis, but is a possibility. This group could be people that have a protected identity, like law enforcement or military also groups of people like refugees are possibly not included in the data. Also what effect does sailors have in this data is an uncertainty.

Also language causes uncertainties. The author's native language is not English and the documentation, GIS-data and some parts of the literature are in Finnish. Interpretation causes uncertainties and in some parts the terminology of the Finnish land-use planning system is hard to translate to English, there is the possibility that the nearly corresponding term in English is not completely correct. Some land-use terms are linguistically and culturally bound to the native language.

The master plan's documentation represents only a small part of the actual knowledge and resources that are used to make the plan. An analogy to an iceberg could be used. Most of the iceberg is below the water and is unseen, while a small portion is visible to the observer above water. This applies to this research, too, the majority of knowledge does not transfer via the documents, and there might be more to the plan than what is revealed to the researcher.

The aim is to document the process of research as well as possible to add reliability of the research.

5 Case study of the Kotka-Hamina city-region

This case study has three main research questions. Firstly how does a land-use planning tool work in a shrinking city-region and how does it guide land-use in the city-region. Because of the nature of the master plan it represents a connection between economic development and land use in a strategic joint municipal level, a kind of plan that so far has not been made in Finland. The strategic stage master plan is a product of multiple other planning documents and decisions, some of which are also analyzed with the master plan.

The second goal is to see how the decisions made in the master plan compare to the situation in the city-region. For this GIS-data is used from 1990 to 2015. The dataset includes inhabitant, workplace and commute data. This dataset helps to understand the changes that are happening in the city-region. The dataset includes information about the age of inhabitants, jobs and commuting distances. Because, at the core, the master plan is a cartographic document, it can be analyzed against the GIS-data and the results of spatial statistical analysis.

Finally the compared results from the GIS-analysis and the document analysis are evaluated against the established knowledge in scientific literature (figure 2). This triangulation of sources and analyses will reveal, how much planning decisions are in line with the regional trends and scientific knowledge and is the master plan capable of dealing with shrinking that the city-region has been faced with.

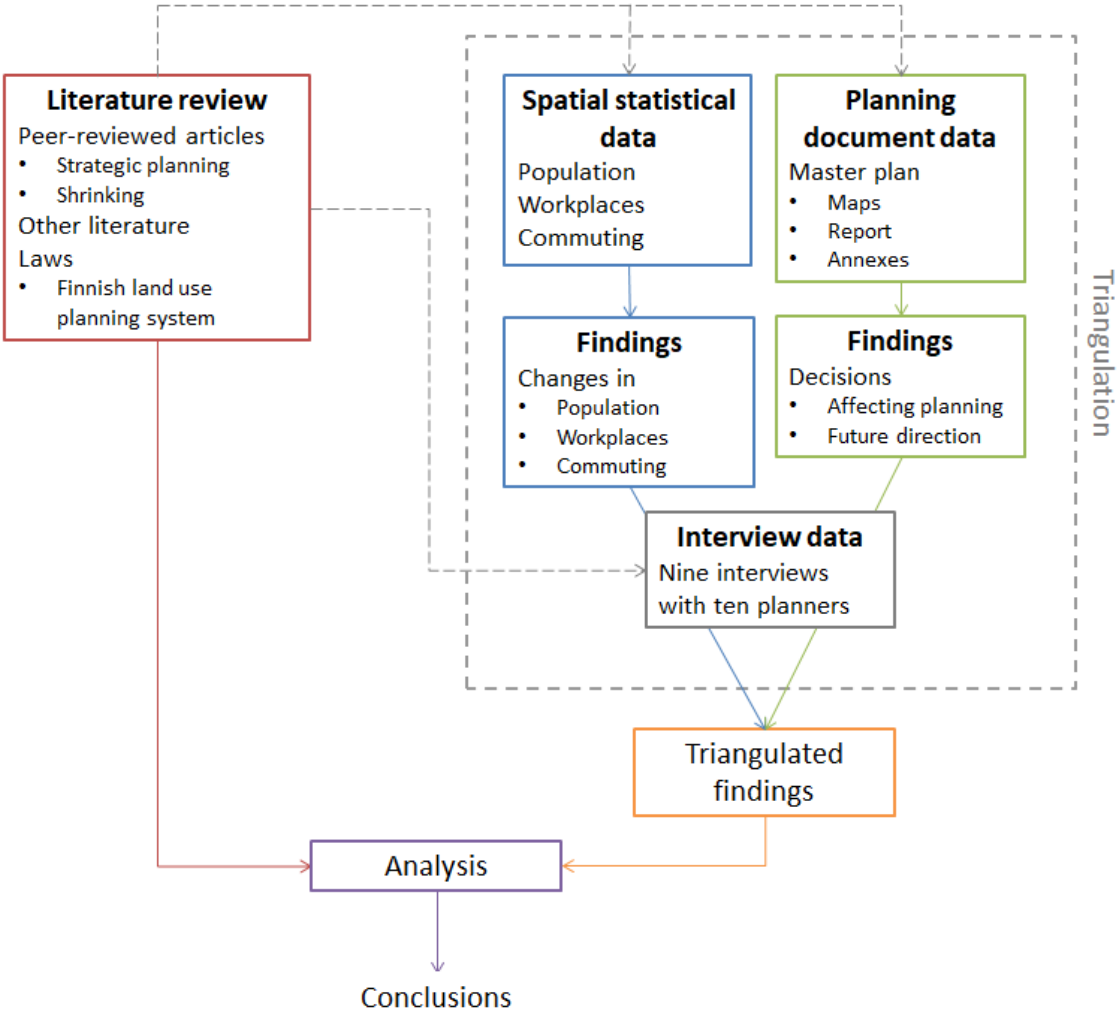

Figure 2. Basic structure of methodology for the thesis and data used in different phases.

5.1 Study area

The study area includes the five municipalities that the Kotka-Hamina city-region strategic stage master plan encompasses. The five municipalities include Pyhtää, Virolahti and Miehikkälä and the cities of Kotka and Hamina. The five municipalities are located in the southeastern part of Finland and are part of the Kymenlaakso region. The region is located on the shore of Gulf of Finland and the E18 route goes through the area, which makes it a part of a larger development corridor from St Petersburg to Helsinki and Stockholm. The area is located in the vicinity of the Helsinki metropolitan area, which is about 130 km away, and St Petersburg metropolitan area, which is 225 km away. The five municipalities have approximately 90000 inhabitants altogether, of which approximately 55000 inhabitants live in the city of Kotka. (Hannonen et al., 2012, p. 5; Ramboll Finland Oy, 2018b, pp. 4, 8) Kotka and Kouvola are identified as the most important cities in the Kymenlaakso region, and Kotka also has the highest population density in the city-region. (Kymenlaakson liitto, 2006, p. 11, 2015, p. 13)

The area of the five municipalities is 3885 km^2 of which land is 2000 km^2. The geographically largest municipality is Hamina, with the size of 1155 km^2 of which 610

km^2 is land area. (Maanmittauslaitos, 2018) The Kotka-Hamina city-region has an almost continuous urban structure from Pyhtää's Siltakylä in the west of the city-region towards Kotka and then to Hamina, which is located in the middle of the region. Outside this zone of urban structure there are numerous rural villages and the municipal centers of Pyhtää, Miehikkälä and Virolahti. (Hannonen et al., 2012, p. 5; Ramboll Finland Oy, 2018b, p. 26)

5.1.1 Population and jobs

Largest of the five municipalities by population is Kotka that has about 54100 inhabitants. Hamina is the second largest by population with 20600 inhabitants. Among the three smaller municipalities Pyhtää is the largest with 5300 inhabitants. Virolahti has 3300 inhabitants and Miehikkälä has 2000 inhabitants. (Ramboll Finland Oy, 2018b, p. 28) The amount of people living in urban areas is 90 percent, while six percent live in the rural villages and the rest in rural areas (Kymenlaakson liitto, 2015, p. 13). The Kotka-Hamina city-region is experiencing that space per inhabitant is growing, which is because of the size of apartments is getting bigger and that the sizes of households are shrinking. At the same time the structure of the area is generally sprawling. (Hannonen et al., 2012, p. 9)

The major industry changes since the 1870s had an effect on the population of Kymenlaakso region. From the population of around 52000 inhabitants in the 1870s, the population began to grow. One hundred years later, the population of the region had quadrupled to around 200 000 inhabitants. (Saarinen, 1992, pp. 17–19) The population of the entire Kymenlaakso region has been shrinking since 1973. The region experienced the strongest growth in the preceding period due to the growth of the paper and pulp industries. (Kymenlaakson liitto, 2006, p. 12) Kymenlaakso region has lost on an average about 500 inhabitants every year and the amount of immigrants is rising. The trend is expected to continue and the amount of people suitable as workforce is expected to shrink also. Kymenlaakso region is experiencing population loss in its main urban areas and at the same time population outside these areas is growing and sprawling. Services have also moved and the trend has been to build services where they are easily accessible by cars. (Kymenlaakson liitto, 2015, pp. 8, 14)

The entire Kymenlaakso region has been concentrated on paper industry and also logistics. In 2011 the Kymenlaakso region had about 70000 jobs. (Kymenlaakson liitto, 2006, p. 16, 2015, p. 8) The study area is relying heavily on port and logistic industries and about 95 percent of work places are located in urban areas (Hannonen et al., 2012, p. 5; Kymenlaakson liitto, 2015, p. 13). Also other forms of industries are common in the area and the close vicinity of Russia has effects on the economy of the area. (Kymenlaakson liitto, 2015, p. 10; Ramboll Finland Oy, 2018b, p. 26) Kotka and Hamina have their own harbors that are today merged into a single company called HaminaKotka Satama Oy, since 2011. This company is the largest international port in Finland and it is made up of numerous single harbors operating under a single company. (Kymenlaakson liitto, 2015, pp. 7, 18) The city-region has experienced a change in the amount of jobs in paper industry. Beginning in 2004, the paper industry has lost a large number of jobs. (Ramboll Finland Oy, 2018b, p. 90)

5.1.2 Background and planning documents

The Kymenlaakso area has a long history of industry. From the beginning of the 1870s, the forest industry has been a major part of the Kymenlaakso region. Before this era the main sources for income had been farming, fishing and cattle. One of the most abrupt areas of

industrialism was the Sunilanlahti area near the coast. Because of the growth in the amount of working place population of the area grew. Population moved to areas near factories and points of good transportation. (Saarinen, 1992, pp. 13, 15–17) Regional planning started in Finland in 1940 to 1942, when the Kokemäenjokilaakso area plan was drafted by Alvar Aalto. The main ideas were to plan over regional boarders and to arrange large scale decisions about the structure of a region. In 1942 right after the first regional plan in Finland was completed, the basis for a similar plan for the Kymenlaakso region was thought up. In 1946 the first regional plan for the entire Kymenlaakso region was completed as the second regional plan in Finland. (Saarinen, 1992, pp. 27–29, 32, 36) This quite ahead of its time, as the first law, the Building act, that introduced the regional plan, came into force in 1958. This kind of planning was not at first mandatory everywhere. (Saarinen, 1992, pp. 61–62)

City-regional planning was started in the Kotka-Hamina city-region in 2007, when the Act on Restructuring Local Government and Services (*Laki kunta- ja palvelurakenneuudistuksesta, Paras*, 169/2007) came into force. The temporary Act was in force between 2007 and 2012 in 17 city-regions and it was meant to improve and create better municipal structures, in view of more efficient municipal service provision and correlation of municipal administrative areas with the functional urban areas. The Act's 4 § states that as a means to improve the municipal structure, a merger of municipalities or parts of municipalities is to be used. But this was not mandatory, municipalities could make collaborative service provision arrangements as the Act's 5 § states. For basic healthcare and social care provision, the guideline for minimum population base for the collaborating municipalities was 20 000 inhabitants. For occupational education service provision the minimum population base was 50 000. In the Act's 7 § municipalities in certain city-regions are obligated to draft a joint strategic plan on how to improve land use, housing, mobility and services across municipal boarders. One of the city-regions identified in the Act consisted of Kotka, Hamina, Pyhtää and Ruotsinpyhtää. (Kanninen, 2016, p. 18; Meklin, 2015, p. 137; PARAS Act, 2007; Ramboll Finland Oy, 2018b, p. 4)

Kotka-Hamina city-region was declared by the Finnish government as an abrupt structural change area from 2008 to 2011. The reason for this was that in 2007 the Stora Enso Summa paper mill in Hamina terminated 450 jobs and in 2009 Stora Enso threatened to close the Sunila pulp mill and terminated 320 jobs. The pulp mill was not closed, but it was sold to an investment company. The former Summa paper mill area was sold to Google in 2009, which Google converted into a data center in 2011. (Felin & Mella, 2013, pp. 10, 40–41)

Because of the size of the area, there are a large number of plans in force in the area. At the highest level there are currently in force five regional plans which all are drawn as stage regional plans. In the beginning of 2016 the process of drawing a new regional plan was decided by the regional council. The number of master plans in the area is around 60, some of the master plans are not yet completed and some do not have legal consequences. (Ramboll Finland Oy, 2018b, pp. 19–25)

5.1.3 Development scheme

During 2007 decisions were made in the city-region about making a development scheme (*kehityskuva*) and a strategic master plan. Work on the development scheme was started in 2010 and it was approved in 2012 by each of the municipalities of the city-region. During

the development scheme process three different visions for the future were drafted. The first one was to continue on the current trend and expand. The second concentrated growth to the villages and city centers. The last one was aimed at growth and this growth was then directed towards a single city-zone. The last one was selected as the basis for the development scheme. The development scheme is described as a vision of the structure that the area is striving towards and it is set for the year 2040. It sets the main principles for planning and is the basis for the strategic master plan and guides the direction of the land use of the five municipalities without thinking about municipal boarders. The main principles for design are land use, housing, transport, services and economic development. (Hannonen et al., 2012, pp. 3–4; Ramboll Finland Oy, 2018b, pp. 4, 12, 84–85)

The development scheme had an objective to point out the areas that were to be developed and how would these areas be developed, to increase the areas strengths. The development plan acknowledged that the area is well connected, the area is strongly marine natured and is part of a development corridor from Stockholm to St. Petersburg. As a goal for the future some themes were selected, which are, commerce, travel, wind power and digital services. Also as a goal the population of the city-region would be 90 000 inhabitants. (Hannonen et al., 2012, pp. 4–5)

The development scheme production was controlled by a group called KASSU, which has representatives from all of the areas municipalities and the regional council of Kymenlaakso. The funding for the project came from European Regional Development Fund (ERDF) and was controlled by Cursor Oy, which is the regional development company of the area. The development plan was created in four phases; scenario, vision, development scheme models and development scheme. The process involved numerous stakeholders, involving politicians in every phase, public participation and workshops. The urban structure of the area was analyzed in numerous reports. The process generated three development scheme models, which were seen as targets for the area, for the year 2040. (Hannonen et al., 2012, pp. 6–8; Ramboll Finland Oy, 2018b, p. 16) These models were selected because these targets could be seen as something that the municipalities of the area could strive towards and the municipalities could commit to. The final development scheme was developed by combining the best properties of each development scheme model. The development schemes objectives are achievable by population growth, and the assessments used a small growth of 6000 inhabitants and a large growth of 30 000 inhabitants. The main principles for land use are firstly to develop existing land use in the areas that have diverse transportation available, strengthening of the development corridor from Pyhtää to Kotka and towards Karhula and possibly the infill of Hamina and the infill of other areas within a one to two kilometer distance of the central areas of municipal and rural centers. These ideas in the development scheme focus on the integrity of the urban structure and try to improve the regional attractiveness of the area. (Hannonen et al., 2012, pp. 10–12)

The development scheme is visualized as a map (figure 3), which is built from several theme maps. The main map shows the main principles for development for the city-region on a very general level. The main map itself is very simplified and consists only of a few categories of markings that show on a very general the main areas and designed uses of areas. There are altogether four thematic maps, which are categorized as central network, habitation and land use, transportation and services and economic development. Each of these maps provides more information than the main map, but none of the maps are an area

reservation map, these maps are more on a general level. The development scheme at the same time improves the rural areas municipal centers and the main development axel from Pyhtää towards Hamina with infill ideas. As principle decisions the existing not yet realized building sites in detailed plans should be realized and after that the current areas would be made more attractive and these should get more building right. In all cases the quality and pleasantness of the areas should be concerned. In the rural areas building near existing central areas is encouraged and elsewhere should be avoided. The E18 route is seen as a major advantage for the area. It is seen bringing traffic and with it people that will be interested in shopping and services. As an idea travelers will be interested in the area because it will be a diverse environment that will provide shoppers with experiences. The traffic generated from the E18 route will stop at these shops and services to experience the area for a few days. Also the traffic flows generated by the E18 route will create new job areas along the E18 route. (Hannonen et al., 2012, pp. 14–23)

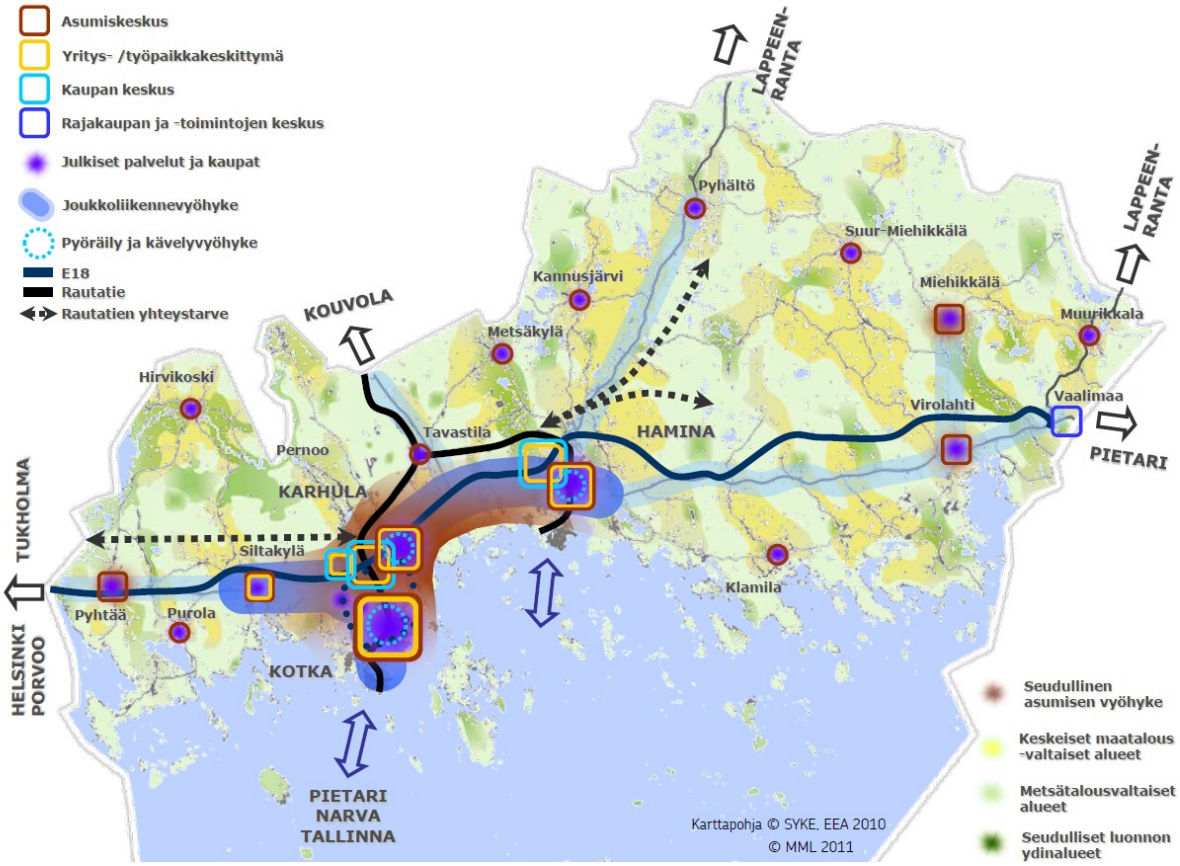

Figure 3. The main map of the development scheme (Hannonen et al., 2012, p. 14).

5.1.4 Kotka-Hamina city-region strategic stage master plan

The Kotka-Hamina city-region strategic stage master plan was being made jointly by the five municipalities of the city-region, but it is not directly a joint master plan, as defined in the Land Use and Building Act, and it is referred to as a 'city-regional stage master plan'. Although being made jointly by the five municipalities, it was to be approved by each of the municipalities separately, which makes it different from the Land Use and Building Act's joint master plan. In the master planning process a single master plan was drafted that encompassed the entire area. The plan will be divided into five separate municipal master plans in the proposal stage of planning. (Ramboll Finland Oy, 2018b, pp. 4, 52)

Also the master plan is designed as a stage master plan that has legal consequences. (Ramboll Finland Oy, 2018b, pp. 4, 63, 67) According to the development scheme the strategic master plan would follow the development scheme after it has been completed. The target year for the master plan is the same as for the development scheme 2040. Where the development scheme is a starting point for city-regional planning on a large level, it needs more accurate planning to be realized and it should be more legally binding for land use planning. (Hannonen et al., 2012, pp. 6, 24–25; Ramboll Finland Oy, 2018b, pp. 52, 63–64)

From the beginning of 2015 to the end of 2017 an ERDF funded project called South-East Leveraging Livelihood (SELL) was realized in the form of the regional strategic stage master plan and its implementation plan. The master plan's drafting can be traced to April 2015. Originally the master plan was drafted as an overall plan that had markings that did not have legal consequences, named as profiling markings, which would give certain characteristics to the area of question. These profiling markings explain the objectives, meanings and targets of the master plan. In the proposal stage the plan was changed so that the markings that had legal consequences were chosen for the master plan with legal consequences and the overall plan is an annex of the main strategic stage master plan. The strategic stage master plan shows how the principles of the development scheme are realized and how these goals are connected to the land use planning. The plan was guided by the KASSU-group as was the previous development scheme. The goal was that the strategic stage master plan would be approved in the municipalities of the area in 2018. (Ramboll Finland Oy, 2018b, pp. 4–5, 12, 54, 65)

The master plan's solution is derived from the choice of the development scheme. The choice was to aim for growth and locate this in a single city-zone. (Ramboll Finland Oy, 2018b, pp. 84–85) As with the development scheme the master plan promotes infill projects and densification of the urban structure. But the master plan is much more specific than the development scheme. The master plan strives to make the areas different by character and create a separate identity for the different types of areas within the design area. The goal of the plan is that areas would be different and inherently attractive, attracting different kinds of inhabitants. (Ramboll Finland Oy, 2018b, p. 5) The master plan's most important aspects are defined as four principles. The first principle is to elaborate the previous development scheme in more detail, so that it can be put into practice. The second principle is to develop habitation and to explore different options for the city structure. The third principle is to respond to the needs of commerce and industry. The fourth and last principle is to develop the rural-like areas. (Ramboll Finland Oy, 2018b, p. 4)

By the end of 2018 the strategic stage master plan had been processed by all of the municipalities in the area. Kotka, Hamina, Virolahti and Miehikkälä had adopted the plan as a stage master plan that has legal consequences. Pyhtää had accepted the master plan as a strategic land use plan. (Kotkan-Haminan seutu, 2018; Ramboll Finland Oy, 2018b, p. 55) The strategic stage master plan was drafted so that it would have legal consequences. (Ramboll Finland Oy, 2018b, p. 63)

According to the minutes of the Pyhtää municipality council, in the last stage of the planning process, the approval stage, it was suggested that the master plan would be accepted as a master plan, but a motion was set that the master plan would be accepted as a

strategic land use plan that would have no legal consequences. The motion won a vote and thus was decided that the master plans type would change. Later during the approval process the motion was change so that the strategic land use plan would also include a marking for an airfield in Pyhtää. This too was accepted and finally the municipal council accepted the strategic land use plan in September 2018, with the airfield marking. (Pyhtään kunta, 2018, pp. 124–126)

The drafting of the master plan had as preparatory work the development scheme, development schemes and a common solution. (Ramboll Finland Oy, 2018b, p. 63) As part of the master plans creation process three development models were used. These models were created using aspects of the regions competitiveness and attractiveness that were seen as something that the region needs. Identification of problems and development opportunities were a goal of this process. With these aspects different kinds of paths to these futures were created. As groups of people, that are wanted were listed for example the following; travelers, merchants, young, urban, inhabitants, workers and inventors. And as important sectors of industry travel, services and renewing industry. (Ramboll Finland Oy, 2018b, p. 56) These models had as main features travel, renewing industry or attractivity of central areas. (Ramboll Finland Oy, 2018b, pp. 56–58)

From these models a common solution was done, that guided the drafting process of the master plan. (Ramboll Finland Oy, 2018b, p. 59) The common solution has three sub-categories and an all-encompassing principle. The all-encompassing principle includes the preparation for growth both in the number of inhabitants and workers. It also guides land-use and the urban structure realization in phases and focuses on the city-regions most important questions. In general the all-encompassing principle is oriented towards positive change and renewal of the area, while trying to be a platform for the future that can be adopted for a variety of futures. The three sub-categories are divided into inhabitation and services “attractivity”, industry “competitiveness” and the urban structure and sustainable transportation. These three generally show what are recognized as the most important features for the city-region. Like what are seen as the strengths of habitation and how should the order of realization for these areas be decided. These three set up the main ideas that should be done in the master plan. (Ramboll Finland Oy, 2018b, pp. 60–62)

5.1.5 Implementation plan

The master plan has an implementation plan as a complementary document, which will have a much faster pace of updating than the master plan. The pace of updating will depend on the growth speed of the region. The implementation plan describes the most important areas that are to face change as inscribed in the master plan. It describes the changes in these areas and gives a schedule for the implementation in phases. Because the strategic stage master plan and the economic development strategy aim at high levels of growth, the implementation plan guides how this growth is to take place and in which phases and order. The implementation plan is used to guide the city-region’s structure to ensure a dense structure in any growth scenario and to ensure that the area grows in an attractive and guided manner. The order in which the implementation plan will be realized is less flexible than the schedule for implementation, which can be adjusted depending on the growth speed. The implementation plan guides the entire city-region, and the municipalities in the city-region have their own implementation plans that will further guide the realization of more detailed planning and for example land acquisition. (Ramboll Finland Oy, 2018b, pp. 6, 65, 78, 87, 103)

5.1.6 Economic development strategy

The newest version of the economic development strategy (*elinkeinostrategia*) was approved in 2016 and it has a vision for 2025. The strategy guides the economic development of the city-region. The current economic development strategy has growth aims for 2025, including 100000 inhabitants and 40000 workplaces, and the main words used to describe the area in 2025 are 'renewed' and 'attractive'. The strategy has a high level of ambition and it recognizes that the city-region must collaborate internally, not having the municipalities competing with each other. The economic development is tied to the usage of digitalization in already existing sectors and also in for example travel sector. The strategy is monitored and reported twice a year to a steering group, which then guide the strategy. (Cursor Oy, 2016; Ramboll Finland Oy, 2018b, pp. 16–19)

The strategy document is divided into three parts. The document has in the first part analyzed the main change drivers and it also has a SWOT analysis. The six main change drivers include for example digitalization, Russia and urbanization. The second part of the strategy focuses on the vision, ambition level and the set of values. It is the part where the goals for the strategy are set. The last part is about how to realize this change. The last part has three subtopics: renewal, atmosphere and attraction. Each of these subtopics depicts a certain theme. For example, renewal is about how the area has renewed and what will the future changes be that can be seen in the current trends likely to affect the area. It acknowledges that co-operation is an important part of the future and that the future will be better if the municipalities work together for the common good. The strategy also acknowledges that there is a mismatch in workforce in the area. There is a high amount of unemployed people, but there are also companies in the city-region that do not have enough suitable workers. The area needs new people that will renew the city-region. (Cursor Oy, 2016)

5.2 Empirical findings

All of the municipalities in the study area are experiencing population loss, the percentage of loss differs and so does the rate (table 1). It seems that the smaller municipalities of Miehikkälä and Virolahti have lost more population in percentage than the other three during the observation period. Out of the five municipalities three have fewer jobs in 2015 than in 1990. Pyhtää and Virolahti have a higher amount of workplaces in 2015 than in 1990, but these municipalities have also lost jobs in some observation cycles. Looking at percentages Miehikkälä has lost 25% of its population and 35% of its jobs from 1990 to 2015. Out of the five municipalities Miehikkälä has lost in percentages the most jobs and population in the time period. Pyhtää and Virolahti have lost inhabitants, but have gained jobs. It seems that there are differences in the way that the municipalities inside the city-region shrink. This might be because of a longer historical setting, meaning that the municipalities have evolved very differently and now they shrink very differently.

Table 1. Change in population and jobs in the city-region. Data © YKR, SYKE ja TK 2019

1990-2015	Population	Population	Jobs	Jobs
Hamina	-1643	-7%	-1998	-25%
Kotka	-2206	-4%	-3521	-15%
Miehikkälä	-688	-25%	-259	-35%
Pyhtää	-363	-6%	39	+5%
Virolahti	-821	-20%	73	+6%
City-region	-5721	-6%	-5666	-17%

In total the city-region has lost about 5700 inhabitants (6.3%) between 1990 and 2015, and in the same period (1990-2015) about 5600 jobs (16.6%) have been lost.

5.2.1 GIS-data population

Population in the city-region is concentrated into a few main areas like the municipal centers of the three smaller municipalities and the main central areas of Hamina and Kotka. Rest of the population is spread around into the rural areas (figure 4). Most commonly grids have a few inhabitants, having population in some areas of 1-3 inhabitants per square kilometer, and in contrast Kotkansaari, the central area of Kotka, has population of highest density with around 6600 inhabitants per square kilometer. If looking at population numbers, most of the inhabitants live in grids that have over 50 inhabitants per grid. In 2015 the population of the region had slightly more female (51%) than male inhabitants, the largest group of population was males between 30 to 49 years.

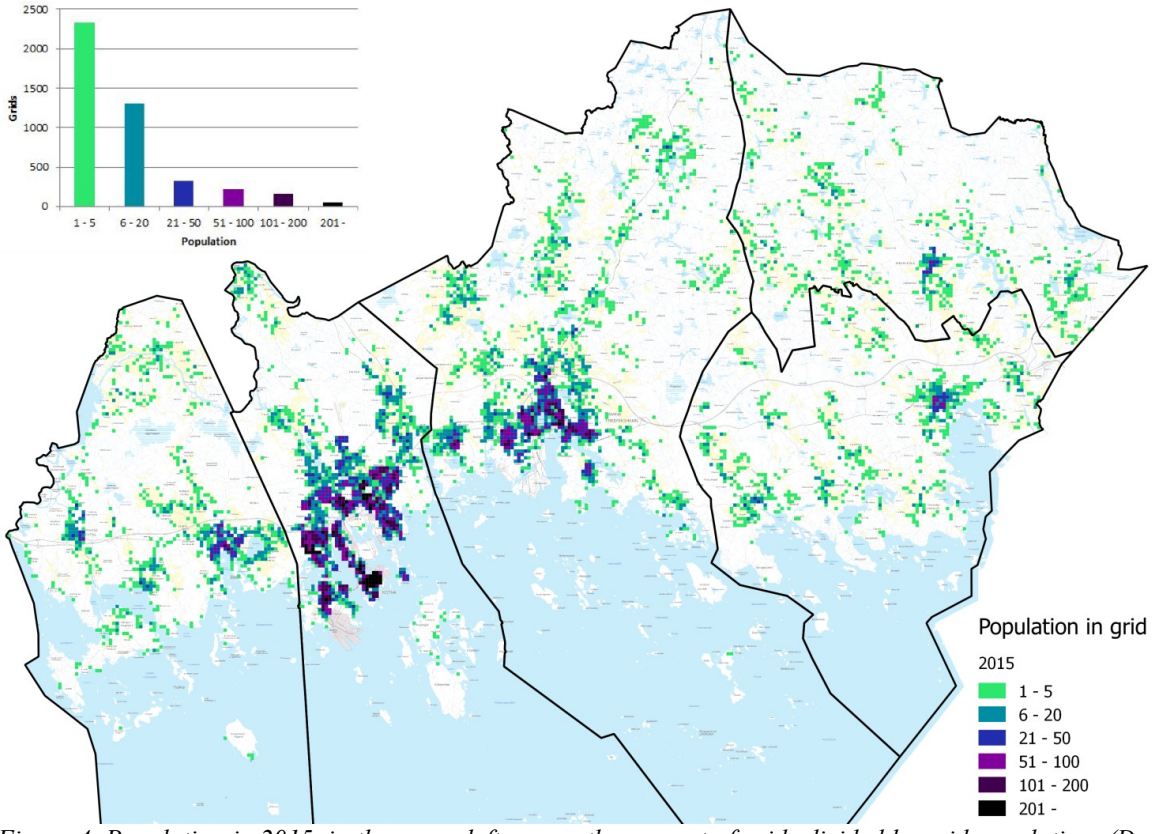

Figure 4. Population in 2015, in the upper left corner the amount of grids divided by grid population. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

Out of the five municipalities only two municipalities experienced one cycle of growth. Pyhtää had a very small population growth from 2005 to 2010 and Hamina had population growth of over 100 inhabitants from 2000 to 2005. Population loss in the entire area has been between 1990 to 1995 and 1995 to 2000 -1.5 to -1.6% in the cycles. From 2000 to 2005 the population of the region decreased slightly by about 350 inhabitants (-0.4%), but then from 2005 to 2010 the decrease was 1.2% and from 2010 to 2015 the decrease was again 1.8%.

In the grids that are shrinking the changes in demography differ from average and the same can be observed in the growing grids. In some of the shrinking grids the amount of people is decreasing but there are not visible changes in demographic split, in other cases the grids are losing population and there is a clear change that the population of these grids is getting older and the amount of children is decreasing.

In the growth grids two interesting generalizations can be made, in part of the grids that have experienced growth, the demographics suggest that in these grids that population consists of young families with small children, and in part of the grids a sudden rise in elderly people can be seen, these grids could have retirement homes built in them in the past 25 years, but this cannot be confirmed with the data used in this study. Also in some of the grids that had no one living or that had very few inhabitants in 1990, had much more inhabitants in 2015, this might be because of new areas that are used for building houses.

In general all of the five municipalities are experiencing a demographic change towards older population. The percentage of population over the age of 50 has risen and the percentage of children under 18 is dropping. The split between genders has stayed somewhat similar during the 25 years, if something the slip has become even more balanced, showing the percentage of women in the area decreasing. In 1990 in the area 50.7% were women, in 2015 50.2% were women. Generally saying the amount of women over the age of 50 has increased in percentage and this is very common when looking at the age group of over 75. The amount of women has decreased between ages 15 to 50, but this trend can also be seen in the male population, but not as so strong.

In most grids the population changes between 1990 and 2015 fall between an increase of 5 inhabitants or a decrease in inhabitants of 5 (figure 5). If looking at individual values, the most common changes are that the population per grid has increased or decreased by either one or two inhabitants. In about 600 grids the amount of population has not changed from 1990 to 2015, but it might have fluctuated in the 25 years. The amount of grids that have shrunk in the number of inhabitants is almost double to the amount that has gained population. If looking at the amount per average grid that has lost population, it is about seven inhabitants. In the growing grids the amount of population growth is about nine inhabitants. It seems that shrinking is more widespread than growth, but growth when it is happening is more effective and concentrated than shrinking.

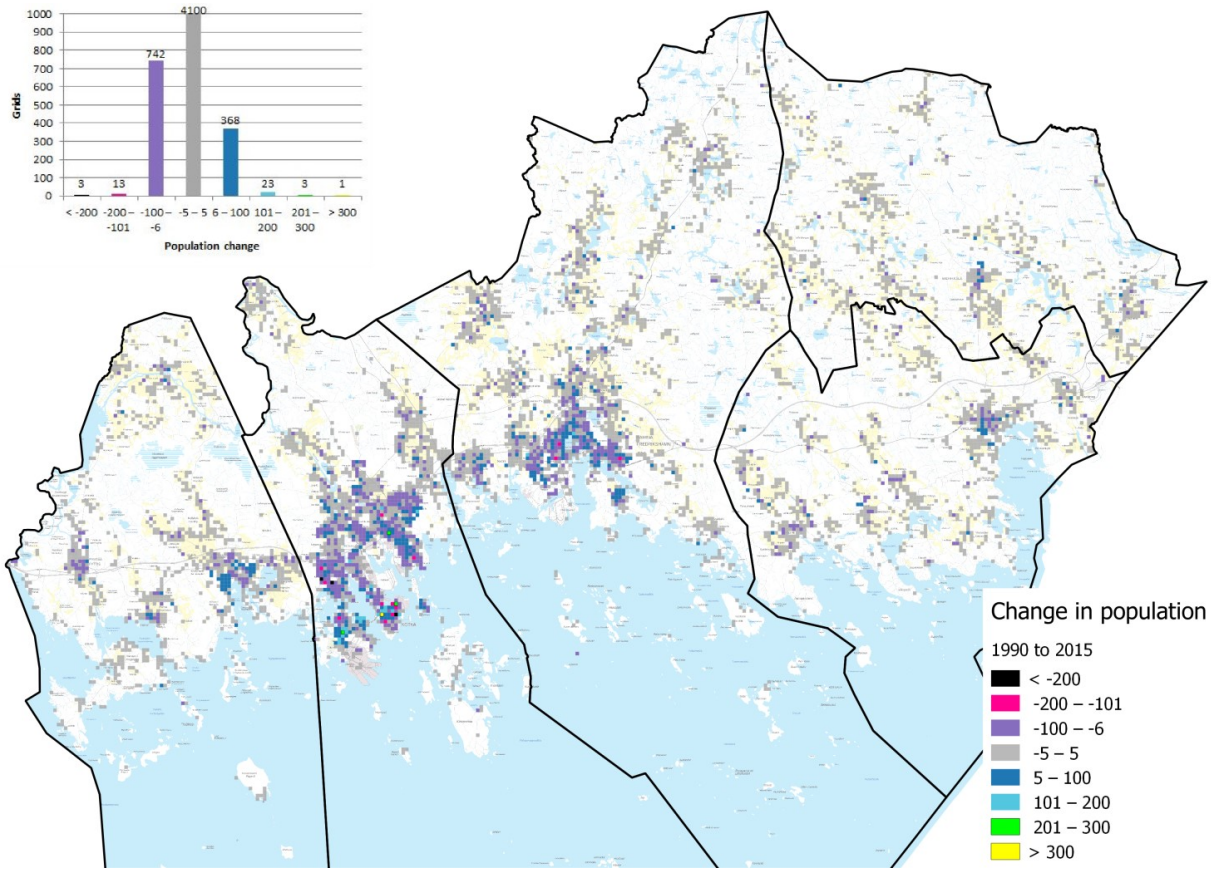

Figure 5. Change in population from 1990 to 2015. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

The amount of grids that have lost all of its inhabitants (679 grids) is about the same as the amount of grids (687 grids) that have had zero inhabitants in 1990 and has been populated after that. But when looking at the population amounts of these grids, the grids that have been populated have in total of about 4900 inhabitants, but the deserted grids have lost only about 1800 inhabitants. Overall the amount of grids that are populated has increased only by eight grids in the survey time. But the distribution is not equal in all of the municipalities. Kotka and Hamina have little more sprawling grids than grids that have lost all of their inhabitants, Pyhtää has 1.6 times more sprawling grids than deserted grids, this being the highest ratio in all of the municipalities. Virolahti and Miehikkälä have a higher number of deserted grids than sprawling grids, in the case of Virolahti the deserted grids slightly outnumber the sprawling grids, but in Miehikkälä the number of deserted grids is doubled compared to sprawling grids. The growing grids are spatially located nearer to existing cores of the municipalities and near the E18 route (figure 6). In 2015 an average inhabited grid had 19.4 inhabitants while in 1990 an average grid had 20.7 inhabitants (table 2). But there are significant differences in the density of each municipality. Kotka had in 1990 on average 50.1 inhabitants per grid making it the most densely populated municipality in the area, but 25 years later it has on average 47.5 inhabitants per grid. This same loss in the average density can be observed in all of the municipalities. Miehikkälä has the lowest density among the municipalities per grid, and the density has decreased in the 25 year observation period.

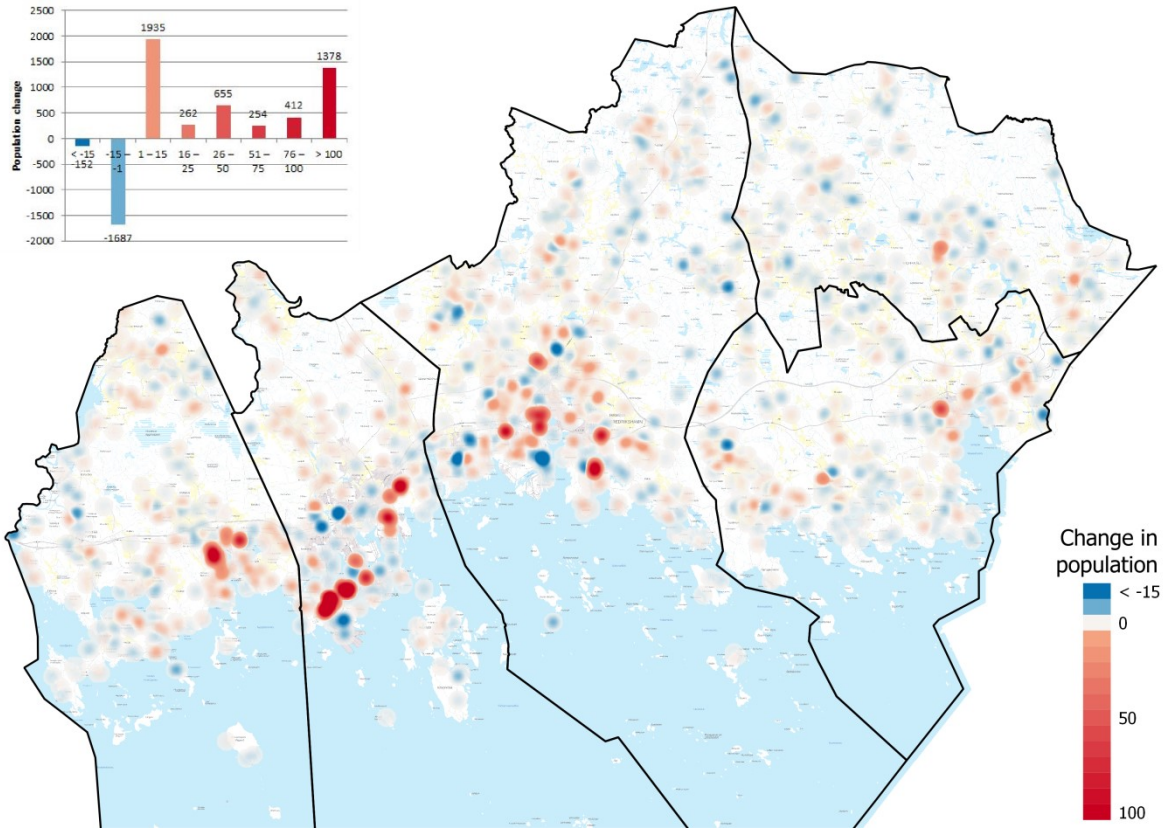

Figure 6. Spatial distribution of the deserted and newly inhabited grids (from 1990 to 2015) and the change of population in these grids. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

Table 2. Average densities per grid and per km^2 in the inhabitant grids. Data © YKR, SYKE ja TK 2019

	1990 persons/grid	1990 persons/km^2	2015 persons/grid	2015 persons/km^2
Hamina	16.7	266.5	15.1	242.2
Kotka	50.1	801.6	47.5	760.5
Miehikkälä	4.5	72.5	3.8	61.3
Pyhtää	8.8	140.3	7.5	119.8
Virolahti	6.0	96.8	5.0	80.3
Region	20.7	331.3	19.4	309.9

If looking at the inhabitant grids one municipality at a time and also in the cycles, some differences can be noticed. Kotka and Hamina have the highest percentage of shrinking grids on average (figure 7), Kotka has at an average 49% shrinking grids and Hamina has 42%. The other three municipalities have at an average between 37 and 39 percentages of shrinking grids. When looking at the average growth percentage of an inhabited grid, differences are more spread (figure 8). Kotka has usually 31% of grids experiencing growth in its inhabited grids, while Hamina and Pyhtää have 26%, Virolahti has 22% and Miehikkälä has 17%. The rest can be called idle grids, which are not experiencing change in population. Miehikkälä has on an average 46% of its inhabited grids experiencing no change, the next is Virolahti at 39%, Pyhtää has 36%, Hamina 32% and Kotka only 20%. Most commonly grids have experienced one or two cycles of shrinking, but when looking at three or more cycles of shrinking it can be found most commonly in Kotka. When looking at growth in all municipalities one cycle of growth is common, in two cycles

differences start to appear. When looking at three or more cycles of growth Kotka has more grids in percentage experiencing three or more cycles of growth than the rest.

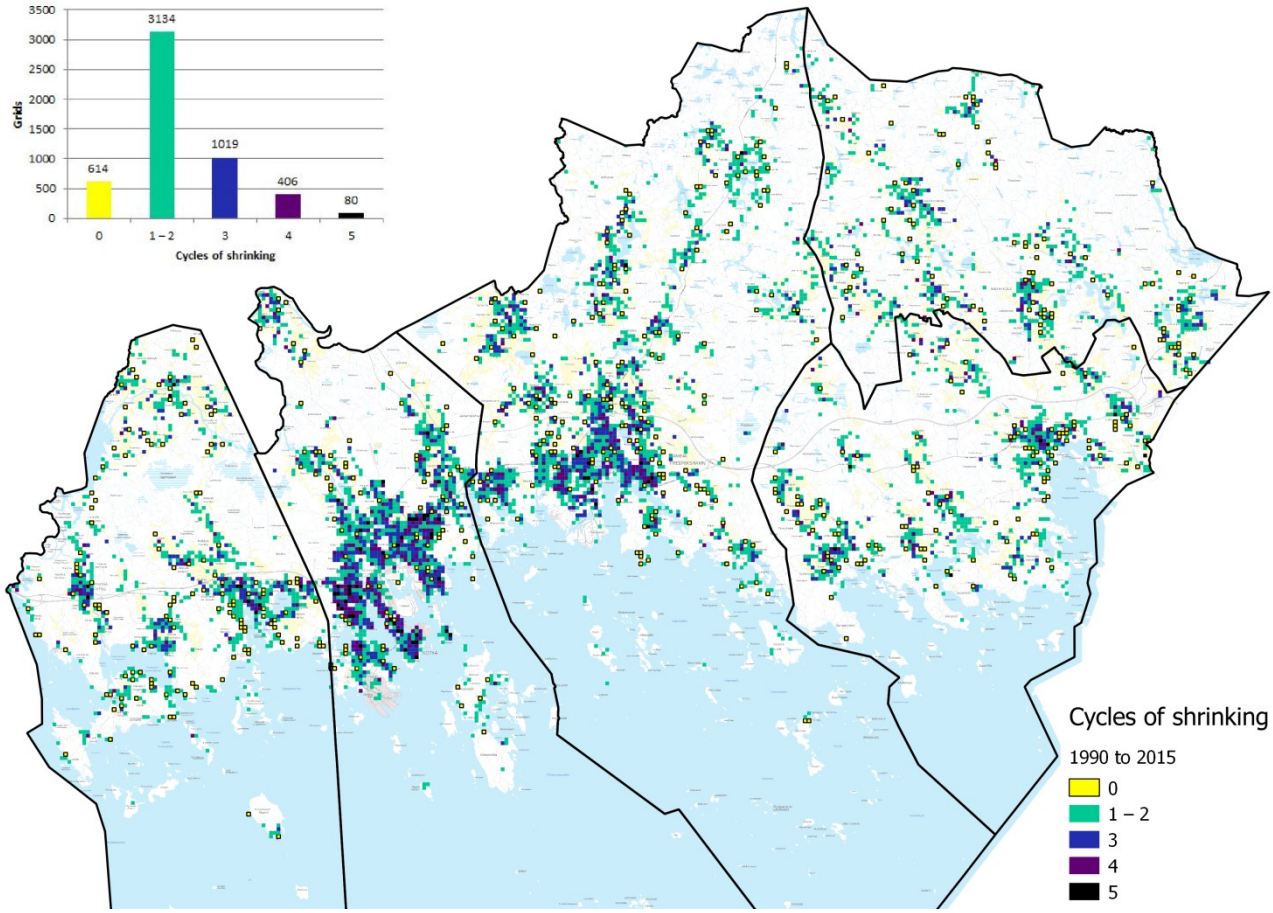

Figure 7. The number of cycles of shrinking that each grid has experienced. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

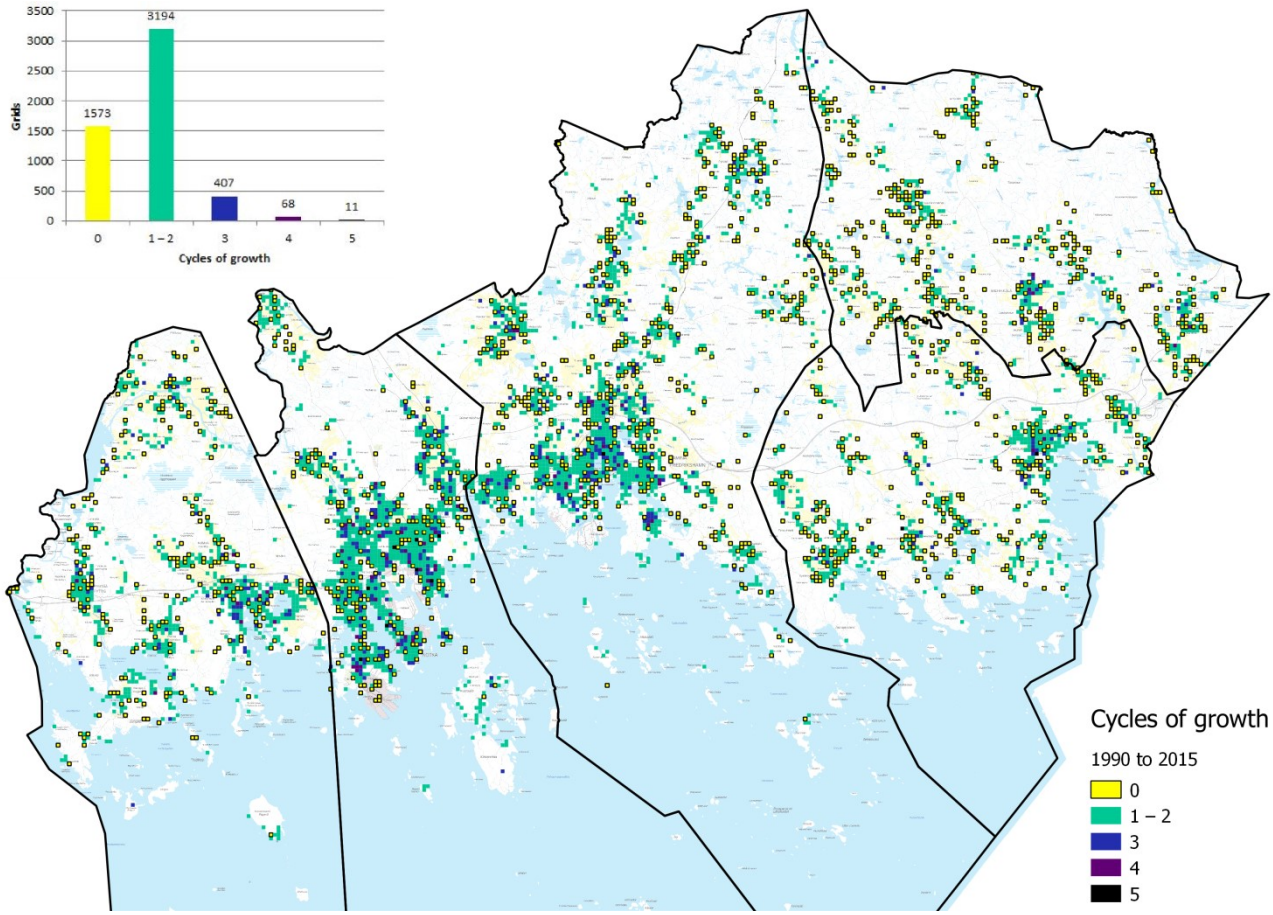

Figure 8. The number of cycles of growth that each grid has experienced. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

Half of Miehikkälä's grids have not experienced even one cycle of growth and out of the ones that have experienced growth, most have experienced one cycle out of five. Shrinking has affected a lot of grids in Miehikkälä, only 13% of grids have not shrunk, but most of the grids have shrunk in one or two cycles. None of Miehikkälä's grids have experienced five cycles of growth or shrinkage, meaning that none of the grids have either constantly grown or shrank in the 25 years.

Out of the five municipalities, Kotka has only 7% of grids that have not experienced shrinking. But on the other hand it has only 19% of grids that have not experienced growth. Kotka has the largest amount of grids that have experienced five cycles of growth and also five cycles of shrinking. The amount of grids that have constantly grown (45 grids) is much higher than the number of grids that have shrunk constantly (8 grids).

By looking at the GIS analysis, it can be noticed that the study area has experienced shrinking. There are only a few areas that have experienced population growth in the five municipalities. It seems that the area is losing population and as a result the population density is lowering. The area of habitation is about the same in 1990 and 2015, but the main difference is that the density is lowering.

5.2.2 GIS-data workplaces

Workplaces in the region are also concentrated into a few main areas, the most visible being the main central areas of Hamina and Kotka (figure 9). Also similarly to population,

workplaces most commonly are found in grids that have one to five jobs, but workplaces are not as heavily spread out as population. Most of the workplaces are located in grids that have over 100 workplaces in a grid, meaning that workplaces are fairly well concentrated. The main sector of employment in the region is healthcare with nearly 6000 jobs, representing about 21% of the total jobs. The next largest sectors of employment are industry with 4000 jobs and commerce with little over 3000 jobs. In total the region had in 2015 about 28500 jobs.

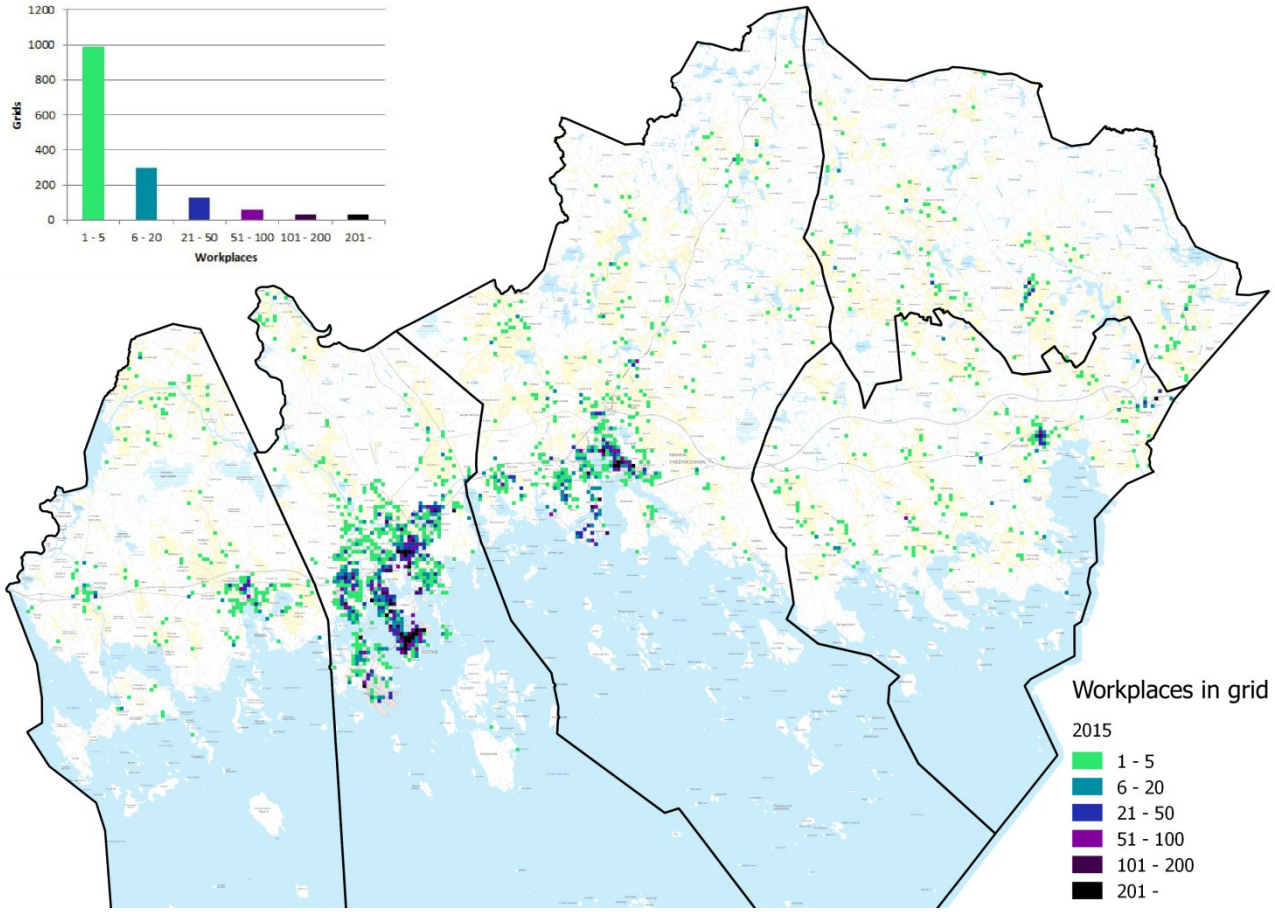

Figure 9. Workplaces in 2015, in the upper left corner the amount of grids divided by grid workplaces. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

Most of the job losses are in the sectors of agriculture and forestry, and industry. The sector of healthcare has gained the most jobs in the city-region during the observation period. The most jobs in the city-region were lost between 1990 and 1995, when a total of 5000 jobs were lost at an average of 14% of working places in the municipalities. From 1995 to 2005 the amount of jobs in the city-region grew by about 2200, from 2005 to 2010 the amount of jobs stayed about the same, but from 2010 to 2015 the city-region lost 2500 jobs.

The strategic stage master plan has a heavy emphasis on travel related services. Travel related services are in the YKR-data, but these jobs are in a couple of groups in the data, so very accurate analysis cannot be made. Jobs in hotels and restaurants have from 1990 to 2015 grown in all five municipalities. There are differences from six percentage growth in Kotka to 100 percentage growth in Miehikkälä. The entire city-region has grown 15% percentages, from 964 jobs to 1107 jobs in this industry. The other industry that has jobs

that are travel related, are much harder to track. This is because the categorization has changed in 2008, and unfortunately the other travel related jobs were transferred to another group.

Hamina has lost 25% of its jobs in the 25 years' period. Most of these jobs have been lost in the sectors of agriculture and forestry, and industry, but also transportation has lost a lot of jobs in the city. Healthcare has gained in percentages the most jobs with a growth of 64%. As a result of this the healthcare sector is the largest sector of employment in the city in 2015. In 1990, industry was the largest sector of employment, but the loss of 1000 jobs has had a major impact on the sector. Kotka has lost less in percentages of its jobs in 25 years than Hamina, but in absolute number of jobs, Kotka has lost the most of the five municipalities. As with Hamina the main sectors losing jobs are agriculture and forestry, and industry, but unlike Hamina, Kotka has lost a lot of jobs in the construction sector. Also similarly to Hamina, Kotka has gained a lot of jobs in healthcare sector. Miehikkälä has in percentages lost the most jobs out of the five municipalities, and the main sector that has lost jobs is agriculture and forestry. Miehikkälä has also lost a lot of jobs in the field of commerce. Miehikkälä has almost doubled the amount of jobs in the field of healthcare, and the number of jobs in the field of transportation has risen approximately by 150%. From 2000 to 2005 Miehikkälä lost 27% of its jobs, this is the most abrupt change in terms of percentages in any of the municipalities in the observation period. Similarly to the other municipalities, Pyhtää has lost a lot of jobs in agriculture and forestry. Pyhtää has almost doubled its jobs in healthcare and tripled the amount of jobs in the construction sector. Pyhtää had a sudden increase in jobs from about 570 in 1995 to 955 in 2000, but after that the amount of workplaces has declined. Virolahti has lost a lot of jobs in agriculture and forestry, and industry. Virolahti is showing growth in the sectors of construction, transportation, commerce and public administration and national defense. The sector of public administration and national defense has grown over 600%, this probably is because of the Vaalimaa border crossing point to Russia. The amount of workplaces has fluctuated in Virolahti in the observation period, reaching as high as 1370 in 2000 and as low as 1111 in 2010.

All of the municipalities are experiencing shrinking in terms of population, but in terms of number of jobs Pyhtää and Virolahti are experiencing growth. But at the same time all of the municipalities are showing similar changes in the structure of the fields of work. Agriculture and forestry, and industry have lost a lot of jobs in the area and at the same time the amount of workers in the health care sector has risen. In the entire city-region, health care jobs have risen about 43%, while at the same time industry has lost 53% of jobs and agriculture and forestry has lost about 72% of jobs. There are differences in the locations of these jobs. If looking at healthcare, transportation, industry, and agriculture and forestry some differences can be noticed. Agriculture and forestry related jobs are more spread out than the other sectors of jobs, and in this sector the jobs vanish everywhere in the entire city-region. Comparing 1990 to 2015 it can be seen that rural and denser areas are losing jobs in agriculture and forestry, from out of 1142 grids in 1990, 993 grids are deserted to 2015. At the same time only 155 new grids emerge. This is a huge number and visually looking vanishing grids are largely located in rural areas. The other three sectors are located much more densely in either municipal centers or then along the E18-route in most cases. Smaller healthcare related jobs, which did not exist in 1990, appear outside central areas, but also exist in the more dense areas. The amount of grids that have healthcare related jobs rise from 175 in 1990 to 210 in 2015. Also interestingly a

few grids that see an increase in healthcare related jobs, see also a rise in population. In some cases these grids are also among the grids that have shown in terms of absolute population, the most growth in the municipality. The population growth in these grids are of elderly people, meaning that in a few grids the population rise can be assumed to come from retirement homes. Transportation related jobs grids do not show much change visually when comparing 1990 to 2015, the same can be said in the number of grids where the change is from 298 in 1990 to 303 in 2015, and at the same time about 10% of jobs are lost. Industry on the other hand shows changes spatially, jobs disappear everywhere and the amount of grids drop from 347 in 1990 to 198 in 2015. What were once dense areas of industry show patterns of thinning out in Kotka and Hamina. Industry is also disappearing in the rural areas.

Of the other sectors of work that are easily comparable, commerce is losing grids and so is education. Commerce related jobs in 2015 seem to be agglomerated in central areas. There are commerce grids also in rural areas but it seems that these grids are becoming more sparsely located. But this decrease can also be noticed in more urban areas. Commerce has lost 35% of grids but at the same time only 16% of jobs are lost. Educational grids seem to be disappearing in peripheral areas, but some are lost also in the central areas, but a school lost in rural area might have a greater effect than a school lost in a central area. This reflects greater distances for children and lower service levels for rural areas. Building sector related grids have risen in the observation period from 310 grids in 1990 to 351 in 2015. It would seem that building industry is sprawling and that there are more grids appearing outside central areas than disappearing. But at the same time building industry has lost 24% of jobs.

When looking at GIS data some hot spots and cold spots can be identified (figure 10). These hot spots or grids (depicted in the map with green and yellow) have had an increase in the number of jobs, while the cold spots or grids (depicted in the map with red and black) have lost jobs during the observation period. Majority of the change has happened with either losing or gaining ten working places.

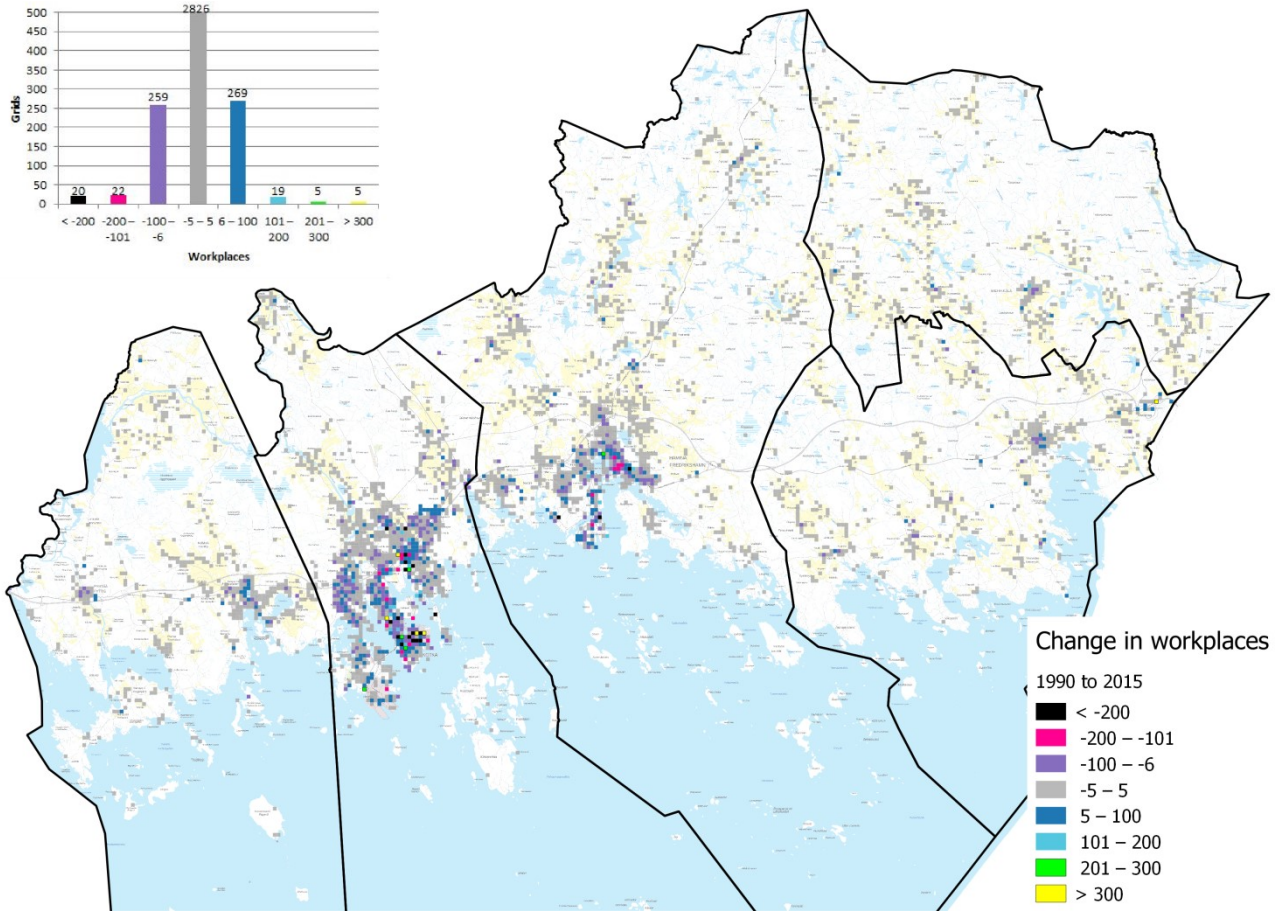

Figure 10. Spatial distribution of changes in the amount of workplaces. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

When comparing 1990 to 2015 the data it seems that there is a large change in the number of grids that have working places. In 1990 2164 grids had 34234 jobs and in 2015 1534 grids had 28568 jobs. In densities per grid this would mean that in 1990 an average grid had 15.8 jobs while in 2015 the number is 18.6 jobs. Working is in the city-region concentrating and the change shows that working is concentrating in areas near municipal centers. Visually comparing 1990 to 2015, shows that grids are disappearing in rural areas, this can be also seen in the GIS-data which shows that large amounts of grids have disappeared in rural areas. While this disappearance of grids in rural areas might not seem in numbers of jobs large, it still means that all of the grids that have disappeared are abandoned of jobs and that large areas are left without any jobs.

5.2.3 GIS-data commuting

Most of the municipalities in the city-region have a higher amount of people's commuting starting points (home) than ending points (work), with the lowest ratio being in Pyhtää (figure 11). Pyhtää seems to be a municipality that a majority of people leave to go to work and not many come to work in. The municipality that has constantly throughout the 25 years a higher amount people arriving to work than leaving elsewhere to work is Kotka, and in 2015 Virolahti also achieved this status. The other municipalities usually have a higher amount of people working in the municipality than leaving it, but also that the arriving people do not outnumber the leaving. The entire region has a slightly larger amount of people's starting points than working points. This ratio has become more balanced from 39744 commuting starting points and 37979 arriving points in 1990 to

33834 starting points and 33647 arriving points in 2015, but as can be seen the absolute total amount of people leaving and arriving has decreased in this time period in all five municipalities.

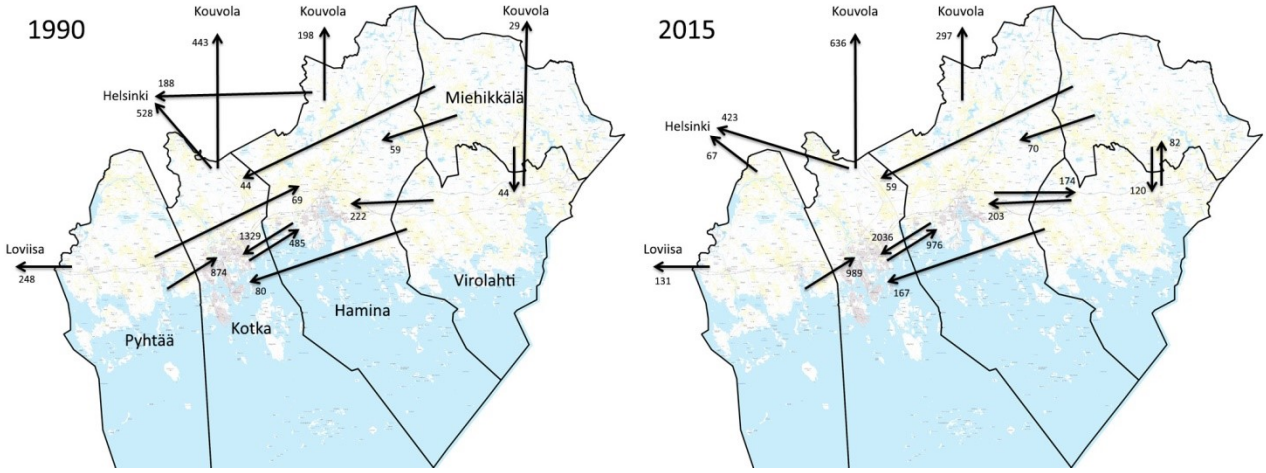

Figure 11. Three most popular outbound commuting destinations of each of the municipalities of the city-region in 1990 and 2015. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

Kotka has the highest ratio in terms of compared ending points of commuting to starting points, meaning that more people come to work in Kotka than leave the city to work (figure 12). The amounts of ending points of commuting have been higher by 3% in 1990 and have increased steadily to 11% in 2015. Most of the commuters leaving are internal, meaning that most work in the same city, but the percentage of internal commuting compared to total leaving commuters has been dropping from 90% in 1990 to 82% in 2015, meaning that more people go to other municipalities to work than 25 years earlier. People outside Kotka usually commute from Hamina, Pyhtää and Kouvola and people in Kotka commute to work in Helsinki, Hamina and Kouvola.

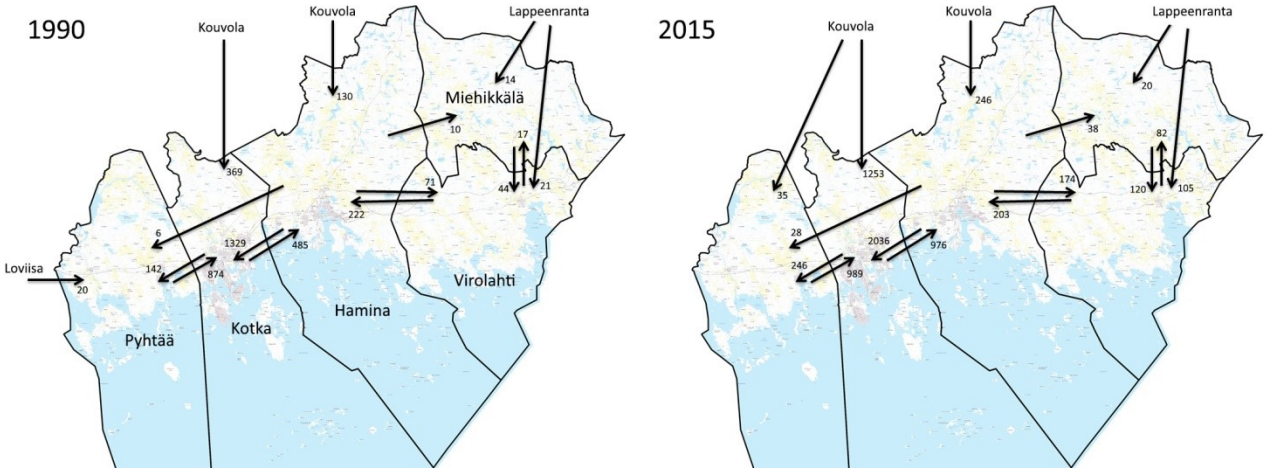

Figure 12. Three most popular commuting arrivals to the city-regions municipalities in 1990 and 2015. (Data © YKR, SYKE ja TK 2019; Background map © Maanmittauslaitos taustakarttasarja ja kuntajako, 1/2018)

Hamina's ratio of ending points of commuting to starting points has dropped from leaving commuters of 10082 and arriving commuters 9124 (ratio of 0.90) in 1990 to commuters

leaving 7612 and commuters arriving 6504 (ratio of 0.85) in 2015. Between 1995 and 2005 this ratio was at 0.93. Similarly to Kotka, the amount of internal commuting has been dropping from 79% to 60% from 1990 to 2015, during the same period the amount of people coming from Kotka to work almost doubled. Majority of people (27% in 2015) leaving Hamina to work in Kotka, and the main place to go to work from Hamina is Kotka.

The three smaller municipalities show similar trends that internal commutes have dropped in percentages from 1990 to 2015 (table 3). In Virolahti the amount of people arriving to work than leaving elsewhere for work has increased from leaving commuters of 1756 and arriving commuters 1511 (ratio of 0.86) in 1990 to leaving commuters of 1242 and arriving commuters 1291 (ratio of 1.04) in 2015. This increase has come from commuters from Hamina, Miehikkälä, Lappeenranta and Kotka, from which the percentages have increased between 240% to 560% from 1990 to 2015. Pyhtää and Miehikkälä have not had the same development, these two municipalities having lost in percentages people arriving to work than leaving elsewhere for work. Commutes from these three municipalities usually go to nearby larger municipalities Hamina and Kotka being common destinations from Miehikkälä and Virolahti, and from Pyhtää people commute towards Kotka, Hamina, Loviisa and even Helsinki. From Pyhtää 48% of commuters head towards Kotka in 2015, which is a significantly larger percentage than in 1990 when it was 36%, but in terms of absolute numbers the amount of commuters towards Kotka has increased only by 115 commuters. Aside from each other, Virolahti and Miehikkälä get workers from Hamina and Lappeenranta, and Pyhtää gets some of its workforce from Kotka, Hamina and Kouvola.

Table 3. Changes in commuting in the city-region. Data © YKR, SYKE ja TK 2019

1990	Commute starting points	Commute ending points	Internal commute	Commute to another municipality	Commute to the municipality
Hamina	10082	9124	7992	2090	1132
Kotka	24324	25173	21838	2486	3335
Miehikkälä	1175	973	914	261	59
Pyhtää	2407	1198	1014	1393	184
Virolahti	1756	1511	1322	434	189

2015	Commute starting points	Commute ending points	Internal commute	Commute to another municipality	Commute to the municipality
Hamina	7612	6504	4596	3016	1908
Kotka	18914	20971	15475	3439	5496
Miehikkälä	686	518	344	342	174
Pyhtää	2041	989	594	1447	395
Virolahti	1242	1291	702	540	589

In general there is a shift towards more inter-municipal commuting and a loss of internal commuting in all municipalities when looking at percentages. Also the average distance of commuting increases from 14.5 km of 1990 to 19.5 km in 2015. Kotka and Hamina see an increase in commuting distances of about 36%, in Pyhtää and Virolahti commuting distance has increased by 24% and the average commute distance in Miehikkälä has

increased 60% from 14.1 km in 1990 km to 22.5 km in 2015. The shortest commutes have the people in Kotka 11.6 km in 1990 and 15.9 km in 2015. The longest commutes in 1990 had the commuters of Pyhtää at 18.0 km but in 2015 the distance was the second longest at 22.3 km, slightly shorter than the commuters in Miehikkälä had. What must be understood of this commuting data is that it shows a start and an end point for the commute, meaning that the distance is a straight line, which in most cases is probably shorter than the actual traveled distance.

The commute information also gives information about how many people work at home, their commute being zero meters. The data does not give information about whether the person is a self-employed entrepreneur or not. The amount of people working at home, drop on an average 70% from 1990 to 2015 in all five municipalities. Miehikkälä has the highest percentage lost at 78% and the lowest being Pyhtää with a loss of 60%. Also at the same time the average amount of persons working at home per grid drop on an average 32% in all five municipalities. Kotka has the highest loss, losing almost 50% of persons per grid working at home. Generally saying, the grids that have lost persons working at home are also losing inhabitants, the grids that have a higher amount of persons working at home in 2015 than in 1990 are usually also showing population growth. The grids that have lost the most at home workers are located in Kotka, these grids have also lost a lot of working places altogether. There is also the possibility that these grids employees have moved elsewhere or they have started to work elsewhere, but this cannot be examined in anyway with the data used for this study.

If looking at the commute data with the people that have zero meters for commute some observations can be made, when comparing the years 1990 and 2015. Generally growth is less spread than loss, growth is happening largely either in the municipal centers or near the E18-route. When looking at losses of home working, if five or more jobs are lost in a grid, these are usually located in the main urban structure of Kotka and Hamina or in Virojoki the center of Virolahti. If less than five jobs are lost, the appearance of these grids spread out all over the city-region are quite common everywhere. The grids that have not experienced change are somewhat spread-out, but there are some concentrations in the main urban structure of Kotka and Hamina and in Virojoki.

5.2.4 GIS-data conclusions

According to the data, the entire city-region is losing population in all of its municipalities, three out of the five municipalities have lost jobs and the pattern of commuting has changed. Also the structure of work has changed in the entire city-region and home working has dramatically dropped in the entire city-region. Commuting has changed towards more inter-municipal direction and also the average distance traveled to work has gotten longer. It would seem that in 1990 working at home was more common and more spread-out than in 2015. Working at home has also had changes. The change is happening everywhere in the city-region, but there are differences in what is happening. It would seem that municipal centers are faring better than rural areas at least in the way that rural areas are losing more jobs than these centers. This change in homeworking is similar than that of working in general, rural areas have less working grids and the ones that are left are concentrating to urban areas.

The city-region has lost between 1990 to 2015 about the same absolute amount of population and jobs (about 5600-5700), but in percentages the city-region has lost more

jobs 16.6% than inhabitants 6.3%. Most of the population lives in municipal centers, but population is still quite spread out, but most of the population lives in agglomerated areas. Growing and shrinking grids differ in the population structure. Growing grids show either a large number of young families with small children or a large amount of elderly people. Shrinking grids on the other hand have generally less children and more elderly population, in general the average age in these grids having increased. But all this can differ from grid to grid. The data also shows that the entire population of the area is on average getting older and that the area has lesser population density in 2015 than in 1990.

There are clear signs that the area is experiencing a shift in jobs and also losing lots of jobs in certain industries. Agriculture and forestry, and industry have lost jobs, while healthcare has gained jobs. Some travel related jobs have grown, but this could be not thoroughly observed, because of changes in the data grouping. If looking at the amount of workplaces in the city-region and the amount of people in the region the city-region gained jobs from 1995 to 2005 and from 2000 to 2005 the population decrease in the entire area was only -0.4% compared to the other cycles average is around -1.5%. The increase in jobs had an effect in population changes, but it still did not manage to entirely stop the population shrinkage.

Some of the municipalities are dependent on the larger municipalities. Kotka and Hamina are very strong at attracting people that commute to them. These larger municipalities have more jobs and inhabitants of municipalities like Pyhtää depend on these for working. Interestingly Kotka is in 2015 attracting workers from Kouvola, which is not attracting so efficiently workers from Kotka-Hamina city-region. The entire region has a slightly larger amount of commute starting points than working points. This ratio has improved and become more balanced from 1990 to 2015, but at the same time the absolute amount of people moving to and from the city-region has slightly dropped. Generally saying, it can be noticed that the area has certain work dependencies between them. There is a lot of movement between the municipalities.

Kotka has had on average the highest amounts of grids shrinking, but at the same time it has the highest amounts of grids experiencing growth. This also applies to how long times have grids experienced growth or shrinking in terms of population. In terms of absolute numbers of jobs lots, Kotka has experienced the most, but this is of course understandable because Kotka is the largest municipality by number of population. Kotka is attracting people from other municipalities in terms of commuting, more people come to work in Kotka than leave there to go work elsewhere.

Hamina experienced growth in terms of population from 2005 to 2010, but has lost population again after that. In terms of jobs a quarter of jobs have been lost in Hamina during the observation period, most being in the sectors of agriculture and forestry, and industry. On the other hand Hamina has gained a lot of jobs in healthcare.

Miehikkälä has lost in percentages the most population and has lost it at the highest annual percentages. A quarter of the population of Miehikkälä has been lost from 1990 to 2015. Miehikkälä has the worst situation if looking at the amount of grids that have experienced growth. Miehikkälä has also lost in percentages the most jobs in the entire city-region, losing 35% of its jobs. In general it can be said if looking at the GIS-data, that Miehikkälä has the worst situation in the city-region.

Pyhtää has more working places in 2015 than in 1990, but it seems that from the peak of 2000 the amount of working places is slightly decreasing in every five year period. The growth in working places can be tracked to an area, which has probably had new industrial buildings build there. Pyhtää experienced a cycle of growth in population from 2005 to 2010, and an increase in jobs from 1995 to 2000, but these trends have not continued. People tend to leave Pyhtää to go work elsewhere and not so many come to work in there.

Virolahti has some special circumstances compared to the other municipalities in the city-region, this is because of the border crossing to Russia. It is attracting workers more in 2015 than in 1990. The sector of public administration and national defense has grown over 600%, this growth can be pinpointed to the Vaalimaa border crossing point. Also the amount of jobs in Virolahti has increased slightly during the examination period, but so has the amount of people commuting to Virolahti. Also more people come to work in Virolahti than leave to go work elsewhere, people might be attracted to come to work in the border crossing area. Virolahti is losing inhabitants, it has lost in percentages the second most inhabitants of the city-region.

What is happening in the region by just looking at population, working and commuting is extremely complex. It would be interesting to see what happens to the amount of buildings in the area. Working is concentrating, while jobs are lost. The population is declining while the area that is inhabited is almost the same. This can be seen in the commuting data. What must also be understood is that the grid data does not show the actual size of a working place, it shows where it is registered to. An actual industrial site might be located in many grids, but it shows up only in one grid.

5.2.5 Kotka-Hamina city-region strategic stage master plan

The master plan is a plan that has pixel type area reservation symbols and point and line type symbols (figure 13). The main map is in a scale of 1:80000 and the central areas have a map of 1:40000. (Ramboll Finland Oy, 2018b, p. 63) Most of the markings have principles that are written to guide land use planning. All of the symbols work on a basis of layering so that an area has usually an area reservation, than on top of that it has a few point or line type symbols that add value or information of the area. Also because of the strategic character of the plan it has development goal markings that guide long term growth for habitation, industry and transportation. The master plan is a hybrid type of plan in a couple of ways. Firstly it combines area reservations, like a blueprint plan, with strategic directions. Secondly it has the formal legally binding land-use aspects, but it also has this informal overall map that has no legal consequences.

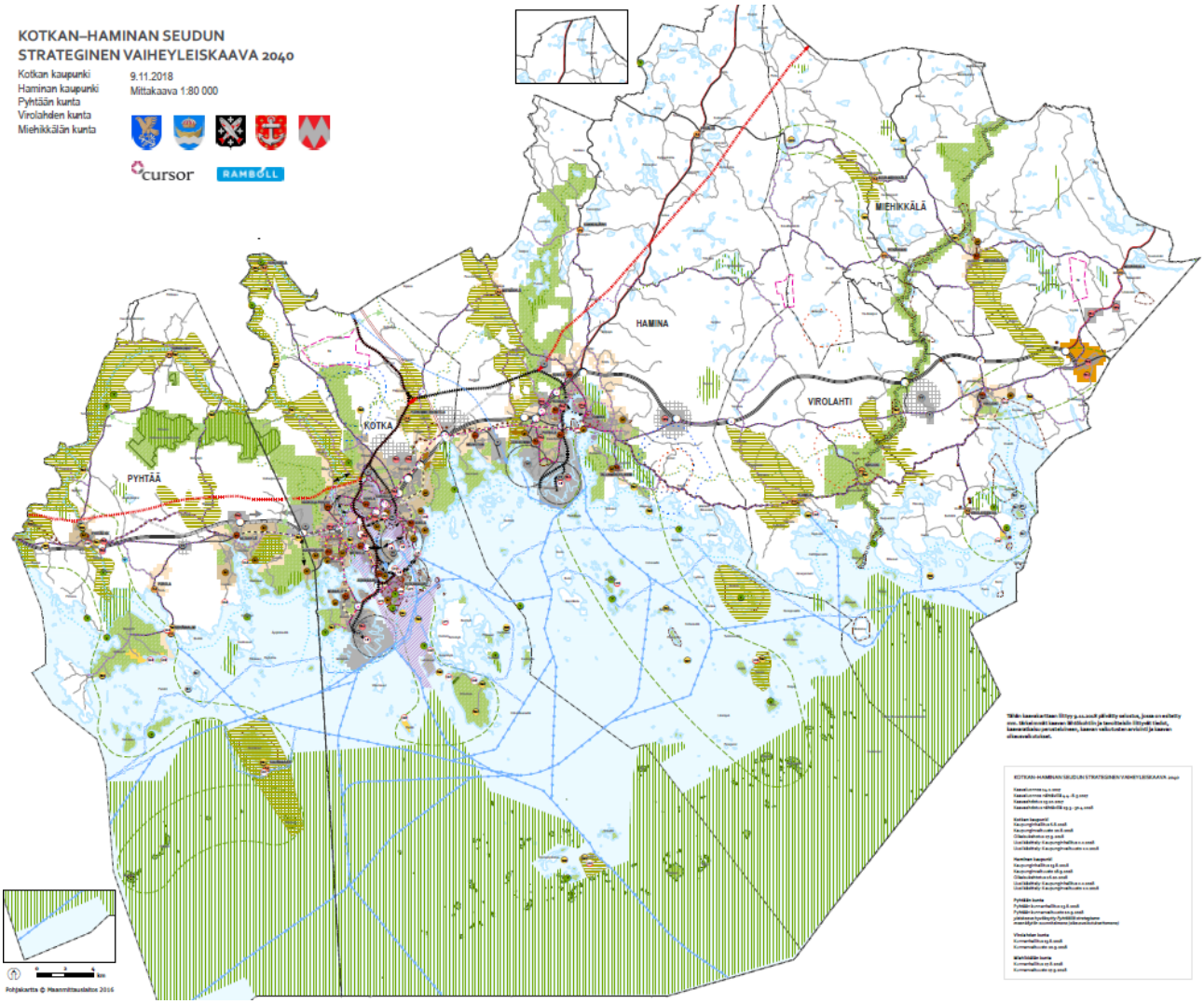

Figure 13. The main map of the strategic stage master plan (Ramboll Finland Oy, 2018a).

Together with the map, the maps ordinances and markings are the strategic contents of the plan. These are opened and explained in the master plan's report with the implementation plan and the overall plan. (Ramboll Finland Oy, 2018b, p. 65) The master plan, according to the plan's report, differs from regular master plans. It was designed as a new innovative master plan that strives to take into account the needs of industry. In the preparation phase of planning, the master plan, which at the time had markings that had no legal consequences, also known as profiled markings, tried to create identities for the different, especially industrial areas, for example using for marketing the area. The master plan's report assesses the impacts of the master plan, mostly focusing on the parts of the master plan that have legal consequences. But according to the master plan's report, it is these profiling and non-binding markings that actually explain what the master plan strives for. (Ramboll Finland Oy, 2018b, p. 78) The master plan is designed to support municipal and regional planning (Ramboll Finland Oy, 2018b, p. 4). The master plan's report states that, because the master plan is a stage master plan, the regional plan will stay in force in the aspects that are not covered in the master plan (Ramboll Finland Oy, 2018b, p. 82).

The master plan, is according to the master plan's report, trying to promote growth and renewal of the entire city-region as a whole. It is trying to question the current methods and

promote a new, more competitive view of the city-region and an image that the city-region wants to prepare for. According to the master plan's report, the master plan has received negative feedback because of its unrealistic growth expectations, but, then again, it has gained positive feedback because of the common vision of the future that it enables. (Ramboll Finland Oy, 2018b, p. 80) The master plan uses the choices made in the development scheme. The main direction is in the urban zone that encompasses the main city structure. In the master plan the main point is infill and densification of the existing structure, to ensure services in these areas. The master plan has also the aim of making the central areas vital and extending them, and also making them accessible to all by walking, bicycling and public transport. (Ramboll Finland Oy, 2018b, p. 85)

The master plan's report describes what the principles and goals for the master plan are. There are 31 of them listed and in addition there are three questions that also have influenced the design of the master plan. The 31 principles and goals are categorized into six groups. The groups are thematic and include, for example, taking into account commerce, preparation of population trends, development of habitation and urban structure and development of rural areas. The 31 principles and goals vary from legal questions of the juridical elements of the master plan to population development and transportation of the area. Some of these are very visible in the master plan's map, for example the development and vitality of the industrial areas and ports, but some are vague at best for this level of planning, for e.g. the promotion of sustainable transport, for example walking and bicycling. The three questions are quite interesting and two of them give a picture of the problems that the master plan had to struggle with. One question suggests that the strategic stage master plan could be used to guide land use in smaller municipalities. Another question questions the position of the master plan and asks whether the guidance should be different in different parts of the city-region, and that is there a need for two different scales of the master plan. (Ramboll Finland Oy, 2018b, pp. 52–53)

The strategic master plan is below the regional plan and works as a layered stage master plan along with "normal" master plans. The master plan works alongside with the more common reservation type master plans and its function is to guide land-use planning on the more accurate level so that this more accurate planning takes into account regional objectives. It is said in the master plans report part that it is a stage master plan, that only expresses an opinion on the most important questions relating to habitation and services, industry and the urban structure and sustainable transportation, which are the same as expressed in the common solution of the preparatory work for the master plan. (Ramboll Finland Oy, 2018b, pp. 60, 63, 67) The master plan aims to work together with the regional plan to solve regionally important questions. The master plan has used the same reports that the regional plan has used and there has been according to the master plan's report a clear distinction between the master plan and the regional plan. (Ramboll Finland Oy, 2018b, p. 79)

The master plan expresses an opinion on habitation and services, industry, commerce and travel, and transportation. For industry the plan is quite flexible and the plan is primarily expressed as enabling for industry. This means that the plan can be suitable for multiple different outcomes and futures related to industry. The plan also relies that companies could use synergies and agglomeration to improve their productivity. Also the master plan makes possible that enterprises of variable sizes are taken into account and that restrictions are kept to the minimum. (Ramboll Finland Oy, 2018b, pp. 5, 63–65, 89) For the master

plan certain areas of specialty have been identified, including cleantech, gaming industry and travel. These sectors have been chosen because they make the area renew and specialize, and these aspects might improve the competiveness of the city-region and attract investments. These specializations are displayed in the master plan, and they are grouped so that these areas might benefit from having similar companies near each other. (Ramboll Finland Oy, 2018b, pp. 88–89) It is expressed in the report of the master plan that there is room for growth in the area reservations of these industrial areas. The area reservations are overlaid with suggestive markings for the area, but the extent of this suggestiveness is left unmarked, because the master plan's report states that the goal is to mix uses and that the drafting has been on a general level. (Ramboll Finland Oy, 2018b, pp. 72–73) As regards the areas for commerce and workplaces, the master plan states that the Vaalimaa border area is a logistical and commercial development area. But the rest of the commerce areas are located within other area reservations. The master plan also follows the regional plan's guidelines, regarding the sizes and locations of large shopping areas. The master plan does not actually make a legally binding solution regarding commerce, except for the Vaalimaa area. Workplace areas are marked with the development symbols TP-1 to TP-5. (Ramboll Finland Oy, 2018b, pp. 76–77) There is also the principle that municipalities would not start to compete with each other for possible companies. This sort of competition is seen as a negative and harmful issue for the entire city-region. (Ramboll Finland Oy, 2018b, p. 89)

The master plan takes into account the current regional plan and is in principle made so that it complies with the regional plan. The master plans report says that the regional plan is inforce with the principles that are not expressed in the master plan as legally binding. Meaning that the regional plan together with the strategic stage master plan, are guiding the city-regions land-use on a larger scale. (Ramboll Finland Oy, 2018b, pp. 63, 67) Currently a new regional plan is being drafted in the entire Kymenlaakso region. Both of the master plan and the regional plan have been worked at the same time. This has according to the master plan's report made clearer what is decided in each of the planning levels and this has also created more co-operations between these two levels of planning. (Ramboll Finland Oy, 2018b, pp. 78–79)

The plan guides habitation to the main inhabited areas and the strategic development goal markings guide habitation and industry to grow in certain directions. These are categorized as strategic choices in the plan. The master plan also enables the differences in identities of areas within the plan area. This is done because the city-region is planned to be formed of different kind of areas that attract different types of inhabitants. The plan markings guide to first use existing not yet realized areas and infill and densify existing structure, before new areas are designed. The plan also has markings to make areas dense enough that these areas are viable for public transportation and the densest areas are located so that these areas are connected to the public transportation development corridor. The primary growth directions for the main urban areas are inward, and after this the area would expand along the E18-route growth corridor. The master plan's report states that the plan aims to strengthen the existing urban areas and service centers that have habitation, services and workplaces. (Ramboll Finland Oy, 2018b, pp. 5, 64) The strategic stage master plan has reviewed the regional plan's urban areas, both the spatial delineation of these areas and the level of their guidance. (Ramboll Finland Oy, 2018b, p. 68) The master plan also designates the denser areas as areas having mixed land uses, services located within a walking distance and a high quality built environment (Ramboll Finland Oy, 2018b, p. 94,

2018a). An interesting feature is that, the master plan aims to emphasize the profiling of different sub-areas. What this means is that the master plan does not try to make the area homogeneous, but to find the characterizing features and aspects of the sub-areas and enforce them. This is done so that the area would remain diverse, having multiple different sub-areas, while the entire area would evolve towards a better future. (Ramboll Finland Oy, 2018b, p. 96)

As a goal the city-region would be made of separate municipalities that have their own roles and identities, but at the same time these separate municipalities would enforce the entire city-region. The report states that the area can provide urban seaside living alongside detached housing near the sea. Also according to the report the areas will be guided by the master plan's ordinances, to make sure that the areas are dense enough for public transportation. (Ramboll Finland Oy, 2018b, p. 64) The master plan also specifies that the most city-like areas of habitation are located only in the centers of Kotka and Hamina, and also in Karhula, which is located north-east of the center of Kotka. These areas are to be developed with mixed and dense land uses in an urban manner. These city-like areas are defined as having a major role in developing the city-region. The plan has also a category of lower level centers, called service centers. The higher level is named P-1 and the lower one is named P-2. The P-1 level service centers are located in denser areas, such as municipal centers or sub-centers, and P-2 ones are located in more rural areas, which might be called villages. The report states that villages can evolve to the P-2 category even if this is not marked in the map. (Ramboll Finland Oy, 2018b, pp. 71–72, 93)

The master plan and its annex the overall plan are quite similar. The master plan's annex differs from the plan that it has more markings, which are called informative and profiling markings. These informative and profiling markings do not have legal consequences. These informative symbols give some areas a certain type of special meaning like fishing travel area or area for data centers. These markings are designed to explain and give more information on the desired future of the city-region. (Ramboll Finland Oy, 2018b, pp. 65, 78)

Strategic choices are most prominent in the master plans markings. The markings and their explanations are the core of the strategic choices of the plan. New growth is directed towards these new housing areas so that they have good services and a good service level of public transport. (Ramboll Finland Oy, 2018b, pp. 5, 64) The strategic stage master plan's report states that the urban structure has been mainly decided in the development scheme, but that the regional plan's structure has also been used in the planning process, although it has been evaluated and revised. The master plan's report has emphasis on detailed planning for guiding more specified land uses, specifying that detailed planning is best suited for guiding urban city-like areas. Interestingly, the report specifies areas outside or near these existing areas of detailed planning areas as areas that are to have a detailed plan, before new development can be allowed there. But at the same time the report specifies that certain areas are designated as areas that are not to be detailed planned, and to these areas it would be ok to build detached housing, if the need for more detailed planning is not met. (Ramboll Finland Oy, 2018b, p. 68) Also the master plan's report says that the master plan will be implemented starting from the inner areas and later expanding outwards (Ramboll Finland Oy, 2018b, p. 80). The master plan also makes long term choices using development markers that mark the future expansion of the areas after 2040 (Ramboll Finland Oy, 2018b, pp. 85–86). As an interesting note, the master plan's report

assessment notes that development in the rural areas is in number less than in urban areas, and because of this the volume of sprawling is not as intense. This might refer that building near the rural villages is guided less, than in urban areas, and that sprawling in rural area is not viewed as dangerous as in urban areas. (Ramboll Finland Oy, 2018b, p. 86)

The master plan makes a choice also in the way that it reserves a route for train tracks much nearer to the urban areas than the regional plan does. It regards this as a reservation that should be studied, but it also reserves the area that the regional plan has marked. This new rail line routing in the master plan is seen as more important and better suitable than the one reserved in the regional plan. It is located south of the E18-route and runs in Pyhtää and Kotka towards Hamina, where it would come together with the existing railroad network. The regional plan would improve only international passenger and freight usage, while the goal of the master plan would be to improve, in addition, local train transport. (Ramboll Finland Oy, 2018a, 2018b, pp. 69–70) This is in line with the master plan's goal to promote public transportation (Ramboll Finland Oy, 2018b, p. 86).

5.2.6 Inconsistency between the master plan's map and report

The master plan is made by two main documents. The Kotka-Hamina city-region strategic stage master plan map (Ramboll Finland Oy, 2018a) and the Kotka-Hamina city-region strategic stage master plan's report (Ramboll Finland Oy, 2018b) are the two main two documents. Between the master plan's map and report there are some inconsistencies. The master plan's map is the primary legal document, the report is not actually part of the legally binding plan, and it is a separate document that has no legal consequences (see annex 1, p. 4). And as such there can be something different in the report when compared with the plan's map. This could be done because a report is easier to read than a master plan map, for people outside planning, and because of this the report can be made to please certain groups, to make it more easily acceptable.

The master plan's report has emphasis on travel related services and a future that can benefit from travel that the area will be attracting. This is not emphasized in the master plan's map. There are some markings and area reservations for travel related services and some are in the overall plan, but there seems to be an inconsistence with how this master plan actually guides travel related services. (Ramboll Finland Oy, 2018b, pp. 52–53, 92–93) The master plan's report at later stages describes only five areas as reserved for travel related services. As suggestive symbols for development the master plan uses RM-1 and RM-2 –symbols. These symbols are spread around the entire area. The RM-1 marking is higher than the RM-2 marking. There is also a suggestive symbol for regionally significant recreational and nature travel destinations. But there is little more than these markings and in most cases these symbols are disconnected from everything else. Some symbols are located in urban areas, but those in rural areas seem to be disconnected. It is questionable, what is the power of these development symbols, in reality, and how people would access these remote locations. (Ramboll Finland Oy, 2018a, 2018b, p. 75)

The master plan's report also states quite often that the rural areas will be kept alive, developed, and that the special features of the rural areas will be acknowledged. But this is very hard to see in the master plan's map. Some of the rural villages do have markings in them, but what the power of these markings is, is questionable. The main areas along the E18-route have more markings and guidance than the rural areas. The master plan's report also names this area along the E18-route as a west-east development corridor, to which

growth will be directed alongside the service villages. But, for example, in the implementation plan's explanation, in the master plan's report, a lot of priority is given to urban areas. The rural service villages are described as alternatives to city-like inhabitation. (Ramboll Finland Oy, 2018b, pp. 52–53, 64, 67, 87, 90, 95, 2018a) The report also states that the master plan does not make an opinion on agriculture and forestry related sectors, which are important in rural areas. The report states that industries like travel are addressed in the master plan, which can affect positively the employment in rural areas. (Ramboll Finland Oy, 2018b, p. 92)

It would seem that the report itself has inconsistencies. The report states that new and densifying areas are located so that these areas are near rivers or the sea, and near existing habitation. But in the cases of Miehikkälä's new area and one in Hamina this seems not to hold true. Neither of these areas is located near these water elements. (Ramboll Finland Oy, 2018b, pp. 72, 85, 95, 2018a) As a goal the master plan's report states that the master plan is designed to improve the city-region's attractiviness especially in the eyes of younger inhabitants. This is to be pursued with building new attractive areas with new habitation modes, and the city-region also tries to improve services for younger inhabitants. This is somewhat addressed in the master plan's map, as the map's ordinance does specify that habitation must take into account a broad spectrum of habitants. But this is not specified in the sense of taking into account younger inhabitants, which probably would also be extremely difficult at this level of planning. (Ramboll Finland Oy, 2018a, 2018b, p. 94)

According to the report, new areas are to be developed only after the existing habitation areas are infilled and densified (Ramboll Finland Oy, 2018b, p. 64). But in the actual master plan's map this is not as strict as in the report. In the master plan's map the text is written in a suggestive way that new areas should be built after existing areas are infilled and densified. (Ramboll Finland Oy, 2018a)

The master plan's report and the master plan itself place general ordinances on green areas, but when looking at the map's area reservations, the green area reservations are stated not to be legally binding. The written part expresses a need for guidance in these green areas and states some goals. It also expresses that in more detailed planning the splintering of green areas should be avoided. (Ramboll Finland Oy, 2018a, 2018b, pp. 67, 71) But this all is slightly odd, because of the fact that the map does not actually make any reservations, nor in any way guides the green areas. Nor does the master plan actually express any broader opinion about the green areas. According to the master plan's report, the intention was originally to have legally binding markings on green areas, but this was then dropped, because it would have required new large scale green area analysis reports (Ramboll Finland Oy, 2018b, p. 71).

The master plan's report describes the industrial areas as quite flexible, and the plan is primarily expressed as enabling for industry. This can be seen in the master plan's map. (Ramboll Finland Oy, 2018a, 2018b, pp. 64, 89) But the master plan's annex then designates profiles for these areas. This could be seen as something that is different from what the report says. The master plan's report has in mind a future that has new technologies and new industries that evolve around such sectors as cleantech, gaming and travel. These sectors are seen as something that might give an edge in the competition for workforce to the area, when comparing the city-region with other similar areas. But if these

are not legally binding markings, this might not be followed. And the master plan has been drafted so that it allows multiple different outcomes and little restrictions for industry. (Ramboll Finland Oy, 2018b, pp. 5, 63–65, 88–89)

Also the report states that the master plan, because of its strategic nature, is not designed to show the actual densities of the areas or the efficiency of the built areas. But it actually does use area reservations, in the form of grids, so this might be said to be quite unstrategic and slightly contradictory to what the report tells. (Ramboll Finland Oy, 2018b, p. 80) These grids do actually give to possibility to calculate densities and represent strict area reservations, even if the idea is to be unprecise and strategic.

The master plan is designed to be monitored. The master plan, along with other master plans, detailed plans and regional plans, forms the city-region's entire picture. The master plan is designed to be implemented in a predetermined order and requires more detailed planning to happen. The order is supposed to be kept even if the growth expectations are not met. The master plan's report does allow the implementation time to be altered, but not the order. The report also states that to get to the desired future requires from the municipalities commitment. The implementation plan is the main tool to guide the order in which the master plan is implemented. (Ramboll Finland Oy, 2018b, p. 103)

5.2.7 Implementation plan

The city-region's master plan has an implementation plan, which has an order and schedule in which the master plan is implemented. The main goal of the implementation plan is to guide growth in any of the possible futures, and it also tries to guide land use in such a way that the city-region would stay dense and attractive, even if the population growth would be slower. The priority is, according to the master plan's report, to follow the order in which implementation will happen. The order and location are shown on a map (figure 14) and the document is an annex of the master plan. (Ramboll Finland Oy, 2018b, pp. 78, 87) The implementation plan has 54 areas and it also has 23 transportation connections. The 23 transportation connections has different kinds of transportation projects from new railroad connections to new walking and bicycle routes. A majority of these projects are located in Kotka. The transportation connections do not have a schedule for their implementation. The 54 areas do have a schedule when they will be implemented, the implementation is split to different periods (2018-2023, 2024-2029, 2030-2040 and 2040 forward). Most of the projects are scheduled between 2018-2023 and 2024-2029. Also looking at the split between the municipalities, Kotka has about 45% of the projects, and interestingly Pyhtää has slightly more projects scheduled than Hamina.

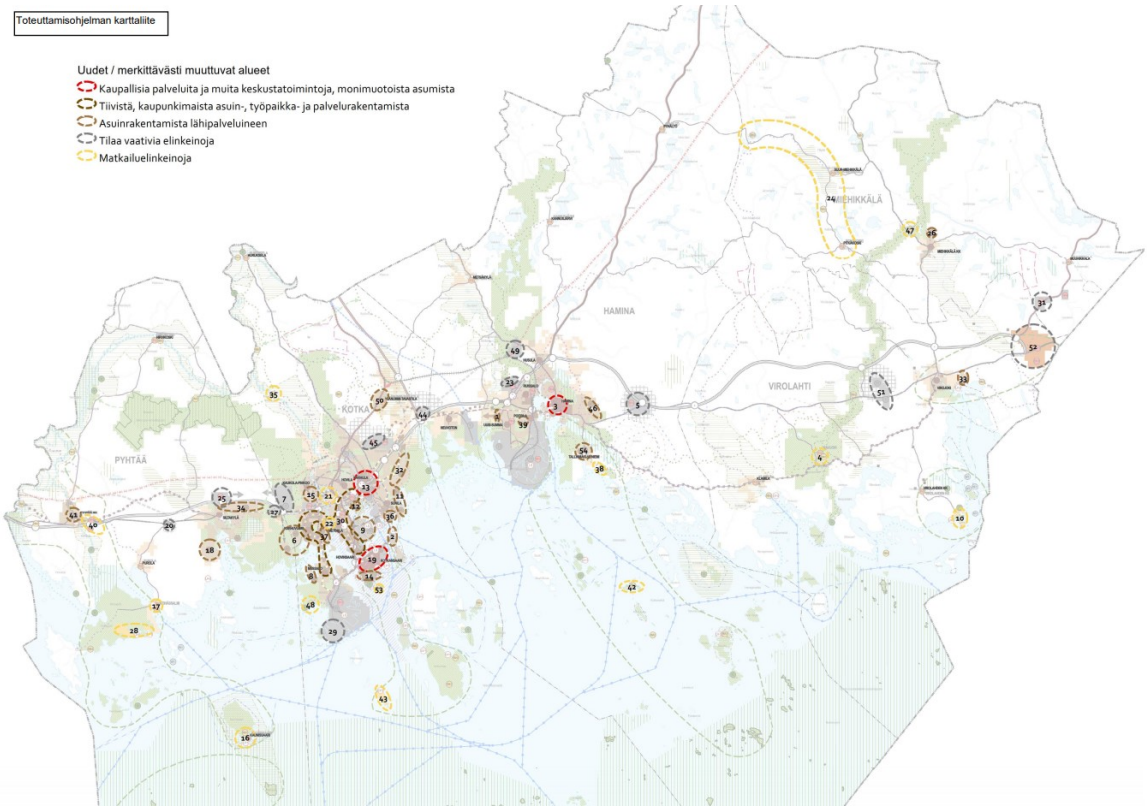

Figure 14. Map of the implementation plan (Ramboll Finland Oy, 2018b).

The implementation plan has five main categories according to which the projects are split. The categories are habitation with local services, commerce and other central services with habitation, tourism, space requiring industry and city-like dense area, with habitation, services and workplaces. The implementation plan places in Kotka 12 new habitation projects and the only city-like dense area, with habitation, services and workplaces. Hamina and Pyhtää get both four habitation areas and Miehikkälä and Virolahti only get one each. The second largest category is tourism which is split more equally between the five municipalities, although Kotka gets again the largest amount of areas. The amount of tourism projects suggests a heavy emphasis on tourism. In the category of a lot of space requiring industry Kotka, Hamina and Pyhtää are getting the largest amounts. There are only three commerce and other central services with habitation areas reserved and they all are located in Kotka and Hamina.

There are differences in the order in which municipalities will realize these five categories. It seems that all of the municipalities will be implementing the first tourism projects between 2018 and 2023. The second wave from 2024 to 2029 sees a lot of housing projects, again tourism projects, and a lot of space requiring industry. The peak of housing projects is in the period between 2030 and 2040, during which space-requiring industry projects will be realized. Kotka is the only municipality that has a city-like dense area, with a habitation, services and workplaces project and it will be implemented between 2018 and 2029. This is interesting because it sees that none of the other municipalities will produce this type of structure.

Spatially examining the sizes of the areas differ and the locations are spread out. Kotka's city-like dense area, with the habitation, services and workplaces project will be located in the areas north of Kotkansaari, like Hovinsaari and north of Mussalo. This area has lost

population in the examination period and has experienced many cycles of population loss, so this plan suggests that there will be an effort to bring population to that area. Habitation areas in the implementation plan are located in areas that have either lost inhabitants or in areas that have population increases. These areas mainly use existing areas and also a majority of these habitation areas are located near the E18 route, also the implementation plan has a lot of the areas marked as densification areas. Habitation in these planned areas is usually currently denser than in rural areas. New areas are being planned near existing areas in Kotka, but Kotka also follows the habit of guiding habitation towards areas that are already habited and have lost inhabitants. If looking at the timing of these habitation areas the ones that are planned to be developed first are usually located near the central areas of the municipalities. Some of the later areas are marked as reserve areas for the population, which implies that they will be used if necessary.

In the three commerce and other central services with habitation that are located in Kotka and Hamina, the implementation will start immediately and are located in the centers of Kotka and Hamina and in the area of Karhula in Kotka. The implementation plan describes the changes in these areas the same, which includes terms like increasing liveability and attractiveness and mixed-type habitation. The tourism areas are spread out more than any other category and can be found throughout the entire area. Some areas are quite large and these types of projects are the first ones to be implemented in large numbers according to the implementation plan. According to the plan almost all of these projects, except one, are to be implemented before 2030. Almost all of the projects have the same description, except the largest one, which has quite a simple description.

Interestingly areas that have lost a lot of workplaces like Summa and Sunila are not listed in the space requiring industry category. This category's areas are located near the E18 route mainly with a few exceptions. By this logic it seems that the municipalities have recognized the importance of the route. The first projects that will be implemented include Mussalo harbor enlargement and Vaalimaa border crossing, which both have experienced growth in the number of workplaces. There are some differences in the area descriptions like the nature of the area, but all have in common that they are described to support new business opportunities and that they are supposed to utilize synergy advantages. Only one of the 13 space-requiring industry areas is listed as a reserve area and most of these areas are scheduled to be implemented between 2024 and 2040.

5.2.8 The economic development strategy

Alongside the master plan, the economic development strategy sets an important aim for the city-region. The economic development strategy guides the economic growth of the area and as such was used in the drafting of the master plan. The strategy gives direction to the area, it guides the city-region towards a change where in 2025 it would have about 8000 new jobs and 10000 new inhabitants. The economic development strategy declares that it will give a direction for the rest of Finland and it also wants to create wellbeing. The strategy takes into account the current major global driving forces and acknowledges the situation of the city-region. The strategy plans to support private entrepreneurship, company renewals and plans to get investments to the city-region. Also startup culture and new ways to learn are emphasized. The strategy highlights that it has changed already for example in the case of paper factories to Google server site and it makes clear that the municipalities within the city-region ought not to compete with each other. The strategy also acknowledges that the city-region has a high unemployment rate, but at the same time

there are not enough employees for certain companies, related to this the city-region needs new people to renew the region. (Ramboll Finland Oy, 2018b, p. 16)

The strategy acknowledges problems such as ageing of the city-region and the situation of Russia in the world politics, but sees some of these as new opportunities, such as the older population requiring new services and the closeness of St. Petersburg. Interestingly the strategy guides towards developing the central areas of municipalities and points that a project called Kantasatama in Kotkansaari is necessary for the city-region's attractiveness and that also the E18 route makes the city-region a part of the main Helsinki metropolitan area. Travel is linked to digitalization, which is one of the most important cross-discipline drivers. Travel is seen as an important part for local, native and international people. The strategy also has an emphasis on restructuring of the old paper and pulp industries, which can provide new fields which are connected to bio industries and circular economy. The strategy also makes clear that the airport is one hour away and it is affordable to live in the area near the sea. The main emphases are on industry, travel and logistics with a cross-disciplinary driver in digitalization.

The economic development strategy is the big picture for the years from 2016 to 2019, the strategy will be followed by reporting twice a year. The strategy has goals which are monitored by indicators. The strategy is a large scale decision of direction for the entire city-region, it sets what is needed for the city-region and then the success is to be followed. The themes of the economic development strategy can be seen in the master plan. The economic development strategy is oriented towards growth, digitalization and new smart technology, industry renewal and, travel and tourism. (Ramboll Finland Oy, 2018b, pp. 16–19)

5.3 Analysis

A comparison of the GIS-data of population and workplaces versus the main map of the master plan was done within the methodological step "regional statistical analysis".

5.3.1 Population and habitation

If looking at the master plan's main map versus the population data an interesting thing can be noticed, the pixel type master plan's habitation areas have been drawn very similarly with the YKR-data grids. The habitation areas are in most areas exactly the same as the YKR-data. Habitation is marked with area reservation symbols which are displayed in grids. Habitation is also marked with point type markings and development direction markings in the form of arrows are used. There are separate levels in the markings, which mean what is the character of the area. New habitation and densification is marked with the same symbol. Habitation areas are in the master plan marked in four different areas reservation markings. The three more intensive areas are meant to be planned in detail or have been already. These areas also are marked for mixed-use, meaning that in these areas work and habitation coexist. The lowest class of habitation reservation marking is not meant to be planned in more detail and these areas meant so that there are mainly detached houses. Generally observing the higher density areas are located in central areas and when traveling away from the center the insensitivity level decreases.

When comparing very generally the strategic stage master plan's main map to the population GIS-data some very general observations can be made very quickly. In the smaller municipalities of Miehikkälä and Virolahti the population is guided to the main

existing municipal areas. These are in the two smaller municipalities the areas that have experienced population growth in away in which the grids are connected, not just single grids that might indicate sprawl. In Miehikkälä and Virolahti the municipal center areas are in line with the existing population, meaning that the areas are about the same size as the population occupies currently. In Miehikkälä and Virolahti the new or densifying habitation areas are marked to the main municipal center to extend the current structure. Outside these municipal centers in the case of Virolahti there is a second habitation area in Klamila, which has not experienced population growth, but it is still marked as a habitation area and it follows the current population structure. This area is not meant to be planned in more detail. In both of the municipalities a network of rural village type service networks can be seen, these are marked with a symbol (P-2). These areas are not meant to be developed with more detailed planning. In more rural areas where population exists in the most recent population data, no markings are shown for habitation except for the service village symbols (P-2).

In Pyhtää the situation is slightly different. The existing habitation structure is expanded in Siltakylä and in Keihässalmi with symbols showing new areas meant for more detailed planning. Because Pyhtää has two centers both have markings that indicate new or densification areas. There is also a completely new habitation area near the border of Kotka. This would mean that the population structure is spreading and this would quite probably mean that now population will move in to the areas. Especially in Siltakylä the habitation area is growing near the E18-route and in the southern part of the current area towards an area called Kiviniemi. As with the two other smaller municipalities Pyhtää has also many smaller service villages located within its municipal area.

Hamina which is largest by the size of land, has outside its main urban area has only Metsäkylä as a habitation area. Metsäkylä is located north of the main urban area and it has experienced some growth, but it has lost more population than gained. Generally in Hamina the trend seems to be similar to Miehikkälä and Virolahti, the current central areas are mapped to the area reservations for the master plan. The population that exist in more rural areas get the service village symbols in many places. In Hamina a symbol for growth direction can also be seen. It is an arrow symbol and it represents the growth direction from Uusi-Summa area towards Neuvoton area (east towards west) within Hamina. In Hamina the usage of new or densified area is used in four locations, three of these symbols are placed on the edges of the main urban area.

Kotka has the largest amounts of areas marked for habitation. Kotka also sees this use of growth direction towards the border of Kotka. The growth direction arrows possibly depict an effort to for a ribbon like city structure from Kotka to Hamina along the E18-route. As symbols these represent strategic choices, these arrows mean that these are the directions that the area will be developed towards. In Kotka there are not as many service village symbols used, but Kotka sees extensive use of new or densified areas. Most of these symbols are placed either new the E18-route or near the main central areas of Kotka, but there are also areas that are not currently habited. Kotka has also the only use of a reserve area, which are meant to be reservation areas for a number of different functions, probably because the possible usage for these areas are seen better to be left open, for possible unknown future development.

Of course the level of detail in this map can cause some of these decisions, only the most important and large areas could be possibly visualized in the map. If these areas would be realized there is the question of sprawl and the lower density of the entire area. The master plan does make clear decisions that areas that exist outside the main structure of either the municipal centers or the E18-route are not meant for more detailed planning, meaning that these areas are not meant to be densified. But also at the same time this is not clearly prevented. When compared to the changes in population rural areas that have lost population are not marked with area reservation symbols, there are in some areas the service village symbol. Denser areas that have experienced population growth are marked with area reservation symbols. In areas that have agglomerated growth usually the area reservation symbol indicates a denser area than nearby, which can be seen as a central area like a city core or area core. In denser areas that have lost population there is no removal of area reservation symbols and there is no orders given specifically to react to the situation. More generally area reservation symbols do have orders related to the realization of the area, there are orders related to densification in lesser denser areas, but no orders related to shrinking.

When looking strictly at the area reservations that are meant either for detailed planning, industry, travel, or for border-related services or commerce, in the immediate vicinity of the E18-route, some important things can be noticed, when comparing the map to the data. These areas are referred to as dense areas from this point forward. For this analysis the master plan's main map was digitized and then compared to the YKR-data. In the case of population, the majority of the city-region's population live in these areas, approximately 83% in 2015. In 1990, the percentage of population that lived in this area was approximately 80%. This implies that a larger share of people live in these more dense areas and that people are agglomerating into these areas. But with the overall population trend in mind, both of these areas are losing inhabitants and there is a major difference. In the more dense areas, the population losses are approximately 3% from 1990 to 2015, while in the same time period the more rural areas have lost 19%. More stunningly, these rural areas have lost only 0.2% in the number of grids during this time period, while the denser areas have gained 1.3% of grids, meaning that the rural areas are less dense and more scattered. In terms of density, the more dense areas had in 1990 975 inhabitants/km^2 and in 2015 932 inhabitants/km^2, while the rural areas had on average in 1990 90 inhabitants/km^2 and in 2015 73 inhabitants/km^2.

When looking at the population data in denser and rural areas on a general level, only slight differences can be seen in demographics in 2015, but the differences were more visible in 1990. While in 1990, growing grids differed from shrinking grids, the same cannot be identified in denser versus rural areas in 2015. Both areas seem to be having a shift towards older population, as the percentage of less than fifty year olds is decreasing. There are slight differences in the two areas. The main difference is that rural areas seem to have fewer eighteen to twenty nine year olds than the denser areas. This percentage difference is almost double in 2015. It seems that this difference is not as significant in 1990 than in 2015. Also the rural areas seem to have slightly more men between the ages of fifty to sixty-four than the more dense areas. Otherwise the differences are quite small between the two areas. In 1990, the differences between the denser and rural areas were a little bit more visible, the rural area having more older people in general, especially when looking at ages above fifty years old. It seems that the demographic structure is becoming more similar in rural and urban areas.

There is little that a strategic stage master plan can do to change this trend, it depends more on other actions than those that the master plan can affect. But the master plan enables and makes the growth possible. The master plan does include new areas for detailed planning, but it can be assumed that the majority of the population growth that the master plan is preparing for is located in these existing areas and the new areas. This would in some areas mean densification. As the master plan's report prepares for population growth of around 35 000 new inhabitants by the year 2040, then this would mean that the population of the denser areas would see an increase of around 50%. The master plan does not state a density rate for the areas, but it does categorize different areas for different types of housing. The master plan's annex, the overall plan, does not specify anything for housing areas.

5.3.2 Workplaces

The separation between habitation and workplaces in the master plan is partly vague. The master plan's area reservation symbols has symbols for three types of mixed land use, detached housing, travel related areas, industry, border and border commerce areas and for reservation areas. Because of this a deeper more thorough analysis is hard to do, but because the area has had a heavy industrial history there is large work areas marked as industrial areas. There are differences in the GIS-data and the area reservation for workplaces related to industry, this is probably because the physical area of for example paper industry is larger than the grid in which the workplace is registered. Also workplaces exist within the habitation areas as services. There are also symbols that specify what type of work is meant for an area. These symbols can be grouped into three categories; industry, harbor and more general work areas.

Virolahti and Miehikkälä both have working places in the municipal centers in the habitation mixed-use areas. There are a lot of workplaces spread out in single grids in these two municipalities, but these are not often reacted to in the master plan. Miehikkälä has two smaller industrial areas near the border of Russia. There are areas in Virolahti that are probably expected to grow. These two areas are Vaalimaa and an area little bit west of Virojoki near the E18-route. These two areas have workplaces currently and the areas have also experienced growth in the number of working places. There is in the area located west of Virojoki a development area marking, meaning that the area is probably expected to grow and is marked for industry. The Vaalimaa area has a distinctive symbol marking and area reservation, it is meant to be a multipurpose logistic and shopping area, with of course boarder services. In Pyhtää single grid workplaces are not mapped, in larger agglomerations the workplaces are located in the habitation mixed-use areas. Pyhtää has a new work area located north of Siltakylä, which is meant for workplaces such as offices and shops. This area has also a growth direction arrow towards Kotka. Pyhtää has also in the midway of Siltakylä and Pyhtään Kirkonkylä an industrial area that also has a development area marking.

Hamina and Kotka also have only larger agglomerations of workplaces marked in the master plan. Hamina has a number of new work areas and it also has a few new areas that currently don't have workplaces and also there are a few development areas marked. The larger areas in Hamina have experienced both growth and shrinking in the number of workplaces. The same signals are visible in Kotka and also the same solutions. There is not a definite breakaway from what was towards something new and alternative. It seems that industry related area reservations are marked in the master plan's map in the same area that

have had or still have industry located near them. In some cases, near the E18-route, industry areas that have experienced growth are marked as development areas. In the case that the area has experienced loss in the number of jobs in industry the area is usually marked in the master plan's map as industrial area reservation, but there is no special marking designated to show what to do with these areas, these areas are just reserved. The same patterns appear with transportation related jobs.

In general areas that have agglomerations of working places are marked in the master plan's map either as habitation mixed-use areas or work areas. These would imply that these areas are to be used also in the future and these areas are not tampered with. There is also the overall plan, which gives the industrial and work areas a certain character, but this document is not legally binding. This could mean that the character of the area doesn't have to be respected and that the idea of an area having a certain specific function could be lost. Some of these symbols have slight contradictions with the legal markings. For example Pyhtää has a data center –marking that is not legally binding, but the area has no reservation symbol indicating workplaces. A similar data center solution can be found in north-west Kotka. Also in the overall plan Kotka gets north of its main urban structure an airport or airfield. A lot of industrial areas are marked as areas suitable for bio and circular economy and in general many areas are pointed as data centers. This might reflect a certain vision of the future that the area is striving for. Interestingly, one type of character giving symbol is located in very appropriate places when comparing the symbols to the GIS-data, the social and healthcare center of experience, meaning a hub of healthcare. The two grids that have experienced the most growth in healthcare jobs are mapped in the overall plan with the symbol. Why this is then not reflected in the legally binding master plan is odd, because healthcare related services are probably important to the area. The other is located in Kotka and the other in Hamina. Interestingly the one marked in Hamina is also the grid that has experienced the most growth in Hamina in terms of population. The population of this grid is mostly elderly. In general most of these symbols that give a certain character to the areas are actually located only in the main urban areas or then near the E18-route. Rural areas have far less symbols than these previously mentioned areas. The overall plan does follow the general direction of the master plan, as it guides the functions to the ribbon like structure near the coast that is connected with the E18-route.

When using the same area as with the population analysis in the previous section, certain interesting things can be noticed, when comparing the denser areas along the E18-route to the rest of the area, which can be referred to as rural. The denser areas have lost 15% of jobs while the rural areas have lost 35% of jobs when comparing 2015 to 1990. In accordance with the population, most of the jobs are situated in this more dense area near the E18. In 1990, 10% of jobs where located in the rural areas and in 2015 only 7%. The overall amount of work related grids have not changed much in the denser areas, but the amount of grids that have lost all of the jobs in the rural area is 48%. Almost every second grid that has had jobs has been lost in rural areas from 1990 to 2015. Outside the major sectors of work, in the rural areas, healthcare, commerce and building related jobs have approximately doubled the amount of jobs in the area. The sectors that have lost most jobs in the rural areas are education that has lost 32% of jobs, and agriculture and forestry that have lost 73% of jobs. In the denser areas, largest job losses are in industry (loss of 54%), agriculture and forestry (loss of 64.5%) and the building sector (loss of 31%), while the mining industry has lost all jobs, but this represents only under 10 jobs. The highest rise is seen in healthcare that has gained 43.5% of jobs.

If taking into account that these denser areas have lost little over half of industry related jobs, the master plan proposes industry related area reservations extensively. There are slightly different types of industry in these area reservations, and the master plan does have mixed land use as a type of area reservation. The master plan's annex, the overall plan, does give new ideas to these existing areas, but the fact that this overall plan is not legally binding raises the question of whether it will have any effect on the type of industry that will actually find location in these areas. As with population growth, the master plan's vision of new jobs is growth-oriented. 25 000 new jobs to the city-region would mean that the areas designated for workplaces would densify. In 2015, the entire city-region had 28 500 jobs, meaning that the amount of jobs would almost double. If also taking into account that working at home has lost 70% of workforce in the observation period, the master plan needs to enable multiple different strategies for the future. The master plan does enable and it does very little to restrict multiple possible outcomes.

5.3.3 General remarks of the comparison

Generally speaking, there is a heavy emphasis on the areas near the E18-route. Habitation and workplaces are being marked near the E18 and the development areas and symbols are located in these areas. Also new areas dedicated for mixed-use habitation are located in these areas. The urban structure near the E18-route will be developed into a ribbon type structure with certain more intense areas.

The master plan's main map's area reservations are drawn very similarly than the existing habitation, if the area is not a new area altogether or new opening. In less dense areas this has not happened, these areas located away from the E18-route and the municipal centers are not marked in any way in the map except for the service village symbols. These service village symbols would imply that these more rural areas are being kept alive even if these areas have experienced shrinking in terms of population and in some cases in population and the amount of workplaces, but the land-use is not guided as directly than in more dense areas.

It might be that the level of detail that can be done at this scale of planning will not take into account the more rural areas. There aren't very much ordered for these rural areas, but this could reflect a strategic choice, the area's growth will be guided towards to ribbon structure of the E18 and that this is the main area that will get the growth that is prepared for the city-region. Also the main development symbols and area reservations are in this ribbon, making it even more important for the city-region. There are a few travel related areas that are spread out and represent important travel locations, but what is going to be the role of these areas is unclear. One of the areas is located near the center of Kotka, but the rest are quite long from the central areas. These areas are described as regionally important travel locations, but what the effect of these areas will be to development is unclear.

The master plan has many reservations for new areas, but it does not mean that all of them need to be realized. If the implementation is executed as needed and is not deviated, the plan can control the development of the area. The implementation plan gives the possibility to react to changes if development is slower than expected or faster than expected.

5.3.4 Interview data

As part of the case study, nine interviews were conducted and analyzed in team-work in course of the Academy of Finland project BEMINE. Interviewees were ten planners involved in the drafting of the Kotka-Hamina strategic stage master plan. From these interviews a generalization was made, so that individuals' anonymity was guaranteed. This generalization was made because of the small number of planners involved in the drafting of the plan and the possibility of identifying individuals based on what they say. The interviews were conducted in Finnish, transcribed in Finnish and then later partly translated to English.

Co-operation was seen as an important part of the entire drafting process of the master plan and it is seen important that this co-operation would continue in the future. In regards to the master plan, it is generally seen that when the five municipalities are working together, the combined effort is more effective than if the municipalities were working separately. The interviewees saw that planning together has brought the municipalities more together and that municipalities have found their own specialty in the larger picture. The different municipalities have different strengths and weaknesses, and these need to be understood and accepted, to respond to the needs of each municipality. The understanding and possibility to think about the city-region in a larger picture was seen as a good thing. The usage of a consultant to draft the plan was also seen as useful, because the consultant has more resources for these sorts of projects and it has more experience with this level of planning in Finland. Also the consultant was seen as a neutral operator, which could mean that none of the municipalities in the area would feel that a certain municipality would have control over the drafting of the master plan.

Many of the interviewees saw that a common shared direction for the region is beneficial. If something is gained in the city-region it would be beneficial for all of the municipalities in the area, not just the municipality that would actually have the private investment, for example, and for this reason it was also seen that there should not be competition in the city-region over these. In this way it was understood that the municipal borders should not be watched when thinking about the city-region. Any benefit is a benefit for all, especially when looking at the city-region from the perspective of economic aspects, and from the view that working together creates a better drive than working separately. The master plan is according to the interviewees a continuum to the development scheme that was drafted earlier. Because the development scheme is not legally binding, the master plan makes the decisions of the development plan more binding and elaborate.

As a statement of unity it was seen important that all of the municipalities would accept this plan separately as a political decision. The interviews gave an understanding that different municipalities had slightly different needs for the master plan's level of detail. Some of the municipalities would have preferred that the plan would have guided more directly land-use planning from the legal perspective, meaning that the master plan would have been able to be used more directly to guide detailed planning. Because the master plan is not as detailed as municipal master plans normally are in Finland, there was some uncertainty on whether there was a need for a more accurate master plan to be drafted in sub-regions before a detailed plan could be drafted. If this were the case then there seemed to be a concern that the strategic stage master plan would create a new level of planning between regional planning and municipal master planning, which would possibly complicate planning more. There were also differences between the interviewees on

whether the strategic stage master plan could guide detailed planning directly. Some interviewees mentioned that detailed planning could be done on the basis of this master plan, but this then depended on the area.

The strategic stage master plan, according to the interviewees, has as a goal to affect the current trend of people moving out of the city-region, and to turn the number of jobs towards increase. There is the fear that if the current trend continues, the service level will also decrease in the city-region. New inhabitants and jobs are needed to improve the conditions. In general, the interviewees acknowledge that the area is experiencing shrinking, and reasons behind this are seen in the downfall of the paper and wood industries. Also some interviewees said that also the decrease in the number of children born in the city-region affects the area's population. The problems seem to be similar in all of the five municipalities in the city-region.

The master plan has a strong emphasis on economic aspects, and as such the master plan works also as a marketing tool, according to the interviewees. The marketing is handled by the regional development company of the area, Cursor. The economic emphasis was selected as a response to the shrinking development in the area. The master plan gives the opportunity to respond more quickly to possible investors that are seeking locations for their businesses. The master plan tries to create new possible paths for the future that can be responded quickly, and at the same time the master plan tries to enable new different sorts of industries to settle in the city-region. As a marketing tool, the plan enables quicker processes for possible investors, and it also gives an image that the area is ready for all sorts of investors.

The master plan is seen as a plan that is not too detailed. The level of detail was described to be higher than a regional plan, but with the usage of the pixel-type grids, the plan purposively differs from a normal area reservation master plan. The use of pixels also means a certain level of vagueness that cannot be zoomed too closely. The pixels are the same as the YKR-grids, so this enables monitoring of the master plan easily using grid data. The markings are not intended to be area reservation markings. According to the interviewees, originally the master plan was a mix of binding and non-binding symbols, but for clarity these were later separated into different documents. The binding markings were left in the master plan, while the non-binding markings were moved to the overall plan. The non-binding symbols, such as the profiling symbols, are used to show special qualities of an area and to make sure certain areas were suitable for different kinds of functions. The main master plan has as legally non-binding the green areas, because, without these areas, the map would appear very empty. At the same time, it is described that these green areas are linked to travel related services.

When talking about the regional plan, the master plan is seen to be more binding and accurate than a regional plan. But when comparing the contents of the regional plan and the master plan, the interviewees saw that the two plans had a lot of similarities. The master plan tries to affect the future regional plan, for example in the case of the new east-west rail route, which the master plan marks in a different location than the current regional plan. But at the same time the master plan works with the regional plan, as the master plan does not express an opinion in all possible topics. The regional plan is in force for example regarding green area planning.

When looking at the plan itself and its decisions, the interviewees discussed about using the existing urban structure first and only after that opening new areas for development. The main urban area would be densified and growth would be directed inwards. The plan shows a strong emphasis on the E18-route in an east-west corridor and shows emphasis on this area. Also words as 'coast' and 'megasites' were used in the interviews, which represent certain focus areas that the master plan is going towards. While industry and economics were seen as important, the interviewees also discussed that habitation is important. For example rural areas were seen as an alternative to urban areas for habitation, while the main focus is on urban areas. The idea is to provide all possible incomers with suitable habitation areas, and these areas are located in multiple areas, with attractions like seaside habitation or good public transportation. It seemed that the incomers were to come from outside the city-region, as newcomers.

The location in the city-region affected slightly the views from interviewee to interviewee. Municipalities that were closer to Helsinki described that Helsinki was near, while municipalities closer to the border of Russia, talked about Russia and tourism. Generally speaking all of the municipalities saw a connection with Russia and possible opportunities, but in some interviews the dependency on Russia was questioned, Russia was seen as an uncertainty, and that for example the leader of the country affected the situation of the country.

Co-operation was seen important, many interviews had some discussion about the region's northern city of Kouvola. Kouvola has had many municipal mergers and because of this, Kouvola is seen as a single municipality, which can be guided by a single plan. Because of the mergers, the population of the city has raised and Kouvola is now seen as a larger city in Finland, and because Kouvola is now a single city, reaction times are shorter. The five municipalities in the southern part of the region, have drafted a plan together to compete against Kouvola. The interviewees revealed that a municipal merger has not been able to be done in the city-region, but there is a clear background in the work reviewing that possibility in the near history. But because the mergers have not been feasible, land-use planning is then done together. This gives the city-region more voice and power than if the municipalities were to plan separately. Planning together was seen also important because the smaller municipalities do not have similar resources than the larger cities in the city-region, and there is also the problem that municipalities do tend to compete over the same resources. Also planning together removes the possibility that two municipalities in the region would plan for similar goals. Interviewees saw that planning together is important, but at the moment the municipalities of the city-region are independent. This independency does create the possibility of thinking why the neighbor should get something that we don't, and this is the problem when the municipalities of the city-region don't merge. Boarders can create problems also, in some interviewees the problem with boarders was talked about. What should happen at municipal boarders and how should these areas be planned together, were seen important issues.

The implementation plan is to be followed in the agreed order. The implementation plan's order can be changed if needed and it is more flexible than the master plan. It is to be followed and the plan is to be updated if necessary and this is supposed to be done together. Interestingly the implementation plan is also to be accepted separately in each of the municipalities, and these municipalities have control over the implementation plan separately. The master plan, the overall plan and the implementation plan form together the

main body of land use. According to the interviews, municipalities have had the ability to affect the implementation plan, and this has been affected by the municipalities' own strategies. The ability to separately affect their own implementation plans reflects each of the municipalities own goals.

The growth comes, according to the interviewees, from other strategies and this goal has been criticized. But it was also seen that the master plan cannot depict a different future than these other strategies. Because the area has lost jobs and population, a new direction is needed. But then the master plan was said to be enabling towards growth, but it does not need growth in order to be implemented and thus the plan could work without growth. The master plan was described also as a direction towards a future that is uncertain, the master plan is an important tool in this search for the future. But the interviewees revealed slight differences in how the interviewees saw what must be done, if the growth is not achieved. One interviewee expressed that if the master plan does not create growth, there is possibly nothing that can be done with a plan. Some interviewees saw that then the plan needs to be reassessed and areas need to be rethinked.

There were certain topics discussed in the interviews that spotted room for improvement how the plan itself or the planning process could be done better next time. Like is there enough strategic choices done in the master plan and could there have been more in the area that could be used in the master plan. Also there was the question of the level of guidance that the plan has, it varied between municipalities, and of course municipalities tend to explain how the plan would benefit their own municipality more than they would explain how it would help the neighbor. Also it seemed that municipal mergers had a strong background in the area and that if mergers were not to happen, planning should be done together, and meaning at some level unity is acceptable. There was also the uncertainty of a new planning level and how it would affect the existing planning system, would it actually slow down the processes. There was also the question that if the desired growth would not be achieved, would a municipality stop using the implementation plan, and this could then lead to a bad solution. An interesting question was also, if a municipality would actually in reality say to an investor that you should go to another municipality. Politically this would be very difficult. Also the future was understood so that if there is no growth, the area would start to wither or fade.

The interviewees had a lot of hope for the future and shared a certain pride for what had been done. Co-operation was good and others were heard. There was also an idea to look outside each of the municipalities and understand that what is good for the city-region is good for each of the municipalities. The strategic stage master plan is meant to be different than a normal master plan and more industry-oriented, and to create opportunities and give areas and the entire city-region a specific profile, with the possibility to suggest multiple locations that are ready for investors. There was also present the aspect that there is potential in the city-region, and it would be wrong not to try to create change, and a belief that once the ball starts to roll everything will start to go better. The emphasis is on the economic and industry related functions to create change, and the master plan is, according to the interviews, a large part in marketing the city-region.

5.4 Triangulated results

The strategic city-region stage master plan is a continuum of the previous plan that is the development scheme. Also other policies and strategies have affected the master plan, and

because the master plan should not differ from these decisions, the master plan is drafted so that it is enabling towards growth and opens a new direction towards the future. Growth is not needed to implement the plan, according to the interviews. The master plan is as a tool more binding than the development scheme. The interviews revealed that the plan is a tool for marketing, to attract new business into the area, and to show the potential and the readiness of the city-region to accept new companies to the city-region. Attracting new companies and new industries to the area is a response to the shrinking. Flexibility and quickness are key for this to happen. The master plan, along with the overall plan, gives ideas of what these planned areas could be in the future. The implementation plan is the tool that is used to carry out the realization of the master plan. The strategic stage master plan is a shared vision of the future of the city-region.

Because the city-region has not had municipal mergers, this master plan is seen as a tool to create the area together. Also the interviewees saw that the area should not be battling over the same investors, but working towards getting investors in the appropriate locations. Also within the Kymenlaakso region, the Kotka-Hamina city-region is creating a counterforce to the larger municipality of Kouvola, which is in the norther part of the Kymenlaakso region. To keep the area vital, new jobs are needed in the area, which according to the interviewees would bring new inhabitants. The main idea of the plan is to infill existing areas, and only after infill would new areas be opened. Habitation is important to the area, the main focus being in the urban areas, but rural areas are also seen as an alternative. Habitation seems to have some focus on seaside locations and good public transportation. The plan and the interviewees show an emphasis on the E18-route in the east-west corridor. Interestingly the areas that have lost a lot of jobs in the area, related to the downfall of paper industry, Summa and Sunila, are not emphasized in the plan. These areas are not listed, for example, in the implementation plan.

The master plan is visually a pixel type plan that is not intended to be too exact. Areas are not designed to be area reservations, and the pixels actually correlate with the YKR-grids, so monitoring of the plan can be done easily using YKR-data. The master plan follows the same habitation areas that are currently populated. The master plan has mainly legally binding markings, while the overall plan does have a mixture of binding and non-binding symbols. The non-binding markings are designed to profile give the areas in relation to each other. While the suggestive guidelines for the areas are not, according to the interviews, designed and meant to be used as area reservations, the areas can easily be interpreted as area reservations. The map uses different types of markings to give characteristics or direction of growth to the plan. Although not said to be area reservations there are different levels of reservations for habitation, designed to show the level of density or intensity to a certain area.

The master plan is in line with the idea that population growth is directed to existing parts, although there are some areas that are marked as new areas. Population is then concentrated mainly to the more dense areas and not towards rural areas, although the plan does not specifically deny building in non-marked areas. It would seem that regarding habitation new openings that have currently no habitation are located in Pyhtää, Kotka and Hamina. The master plan makes a ribbon-like structure between these three municipalities, following the E18-route. The plan raises questions about density. If population growth is not met, there is the possibility that population will sprawl. There are no orders related to shrinking, there are orders related to densification. According to certain interviews, the

population growth aspect of the plan is not needed to implement the plan, but there is guidance only in terms of growth. It would seem that population losses are less affective in the denser areas, but the population is being lost everywhere. Also the more dense areas are sprawling, and this affects the population density even more. Rural areas, for which the plan does not give direct guidance, are losing population more severely, and these areas are not sprawling. Rural and denser areas are also becoming more similar in terms of demographics, than they were earlier. There were in the interviews certain mentions that the city-region can provide different sorts of habitation areas for the future inhabitants of the city-region. This is reflected in the denser new areas, but rural areas do not seem to have these properties. Rural areas do have the service village markings, but these are almost the only markings that are profiling these more rural habitation areas.

Because the master plan is oriented towards industry and economics, there is a need to bring new companies to the area. The area needs a new direction according to the interviews. This new direction is visualized a lot in the overall plan, which has the profiling markings. These profiling symbols are mostly located in denser areas and near the E18-route. But when comparing the overall plan to the legally binding plan, then the legally binding master plan does not give a different idea for the industrial areas, the areas are mostly the same that exist currently. Vaalimaa is an interesting case, it depends on Russia, even though some interviewees saw that Russia is unpredictable. Overall the city-region is near Russia, and this was acknowledged in the interviews, and because of this, tourism is visible in the master plan. There are some interesting features in the overall plan, like the amount of data centers and the airport or airfield in Kotka. The master plan and the overall plan both do give emphasis to the E18-route and its vicinity, and this is also visible in the implementation plan. This of course is understandable especially if looking how rural areas have lesser amounts of jobs, and considering that the rural areas have lost more jobs in percentage than the denser areas. The area has lost a lot of industry and agriculture and forestry related jobs, while it has gained healthcare related jobs. The interviewees saw that the area needs a new direction, perhaps meaning that paper related industry is not the future of the city-region. The legally binding master plan map shows a lot of industry related areas, and then the legally non-binding overall plan does give these areas new profiles - but can this actually happen? The goal or preparation idea is that the area will almost double the amount of workforce by 2040, but taking into account the demographic changes in the area, with people getting older, it can be presumed that the area needs a lot of newcomers to the city-region in order for this to became reality. The master plan is described as enabling for industry, meaning that a lot of different outcomes can be created with the plan. It will not restrict different outcomes, if looking at the legally binding part of the plan, and because the overall plan is legally non-binding, this will probably not restrict possible investors either. This also means that restrictions are kept to a minimum, and because of this, the overall plan with the profiling markings are possibly forgotten, when a large investor interested in the area turns up.

Implementation of the master plan is guided by the implementation plan, which gives the order and schedule to the progress based on the master plan. The implementation plan is to be updated and it is separately accepted in each of the municipalities. The master plan, implementation plan and the overall plan create the main body for guiding the future land use in the city-region. The implementation plan can be altered, but the process is accepted separately in each municipality, but according to the interviews, the future steps will be discussed together. The implementation plan can possibly guide the progress of the city-

region even if the area is not experiencing the growth that is desired. The majority of the projects that the implementation plan has are by type areas and the majority of projects are located in Kotka. The implementation plan has a heavy emphasis on habitation and tourism, followed by industry. Interestingly there are more travel related projects than industry related projects, but during the interviews this aspect was not discussed as much as industry and how it could be enabled. The order tells how the process of city-regional development is to be carried out. It seems that the implementation plan will bring population to denser areas that have lost population. Densification seems to be the selected route for the implementation plan and also for the master plan to be implemented. Generally speaking, priority is given to areas near central areas, and this was also mentioned in the interviews. The lasts ones to be implemented are the reserve areas. Also the implementation plan gives emphasis and priority to Vaalimaa border crossing area. Other industry areas are to be implemented, too, and these areas have in common the idea of new business opportunities and the utilization of synergies and clustering between different operators.

6 Discussion

6.1 Guiding land-use in a shrinking city-region

How does city-regional strategic master planning guide land-use in the shrinking city-region of Kotka-Hamina?

The planning documents are striving to make both the major city areas stronger and the smaller rural villages more vital. The documents also offer habitation areas for all sorts of preferences as the documents say that you can either live near the sea or then in a densely populated area and still be close to the green arteries of the city-region, which are seen as a goal for the strategic stage master plan. But the actual legally binding master plan's map does not assign so much to these rural areas. The emphasis is on the ribbon-like urban structure near the E18-route. The symbols used for these rural areas are not area reservation markings, these markings are actually categorized as principle markings. The meaning of these principle markings is a little unclear, but it can be understood as a sort of symbol that characterizes what is the role of the area. The overall plan neither assigns much to these more rural areas, most of the overall plan's characterizing markings are located near the E18-route. It would seem that these rural areas are not treated as well as the more urban areas. Could this then mean that it is expected that the population will move to the ribbon-like area? And does this also then mean that the population that is expected to move to this area will do so, too? The area has experienced shrinking in the way that it has lost population, but the area that is habited is about the same in 1990 and 2015, meaning that the areas density has lowered. This seems to be in line with international research (Haase et al., 2016). In light of this, it seems to be a valid decision to concentrate population to these more central locations.

The strategic stage master plan alongside its annexes point a direction in which the city-region should strive towards. There are strategic choices, but these strategic choices are prepared towards growth and not accepting a shrinking future that would follow the current trend. As a planning document it represent voluntary planning between five municipalities, which is a positive sign, the city-region is trying to solve problems together and making decisions about the future together. The master plan was designed as a legal base for all of the municipalities, perhaps as an effort to try to work together to get the city-region to develop, instead of the municipalities battling individually against each other to get a company in to their own municipality. Unfortunately one of the five municipalities decided to use the master plan as a strategic land-use plan that has no legal consequences.

The plans understand that to improve commerce, the current central areas should be improved and the future projects should be concentrated in these central areas so these areas would strengthen. According to the documents rural areas will get new jobs because of travel and nature related services, which will attract new inhabitants to the area. The GIS-data shows that people currently commute longer distances than before. There might be a risk that jobs are born in these rural areas, but people will commute from longer distances to these jobs and not move to these municipalities. Also the main urban area will get a lot of the new job areas. These job areas are designed to be flexible and adaptable, show changing demands can be handled quickly. Also the documents suggest that new sectors of industry are identified as having potential for the city-region like gaming, cleantech and bio-based economy.

The targets for the master plan are in some cases growth-oriented, but at the same time the targets are aimed at strengthening the area and making decisions that have consequences for the entire city-region. Solutions are planned to be flexible and reactive and to enable innovation. But also the existing industry is tried to be promoted and a low carbon future is promoted with good public transportation.

There is a strong emphasis in the master plan for travel related services and these will be the first ones to be implemented in the area. The reason behind this is the speculated growth of the amounts of traffic on the E18-route. People on route would stop in the area to shop and spend a couple of days in the area. There is growth in some travel related industries, but this is missing certain travel related jobs, which make the analysis unreliable. The overall plan gives certain characters for some of the areas in the master plan, but is this actually enough to attract travelers? The overall plan does not have legal consequences, so it can be questioned whether these symbols actually make any difference.

Co-operation is seen as an important part of the planning process. The municipalities work together to react to the situation of shrinking. The municipalities have also found their own places and specialties in the region, not just trying to be similar and trying to attract the same possible investors. Also working together towards a shared future is smart and the plan is also a political decision that guides the area towards the future. This seems to be what Albrechts and Balducci (2013) call for. The master plan also has a tone that it tries to compete with the regions northern large municipality of Kouvola. Because Kouvola has had municipal mergers the guidance is easier in Kouvola than in the five municipalities of the master plans city-region. Also the master plan seems to be a tool for co-operation, when municipal mergers cannot be accepted. Especially this can be seen because Kouvola has had multiple municipal mergers in the past.

The documents of the strategic stage master plan and the development scheme acknowledge that the population of the city-region has declined, but the documents plan for growth or at least prepare for growth as is said in the planning documents. The documents also acknowledge that the population structure is getting older. Both documents have an emphasis on attracting new citizens to the city-region. Both of the planning documents make an opinion on the structure of the area in terms of habitation. The plans first are planning to use existing not yet realized areas and infill existing structure, before new areas are designed to be planned. This is a good strategy because this could make the main areas more populated and keeping the services alive, enforcing the possible use of public transportation and the infrastructure in good use as opposed to letting the habitation areas sprawl. The idea to attract new population to the area as newcomers is smart, as the city-region is also trying to renew its' industry. This change in industry might attract younger and better educated to the area, as has happened in some locations (Rink et al., 2010) and this might be also a smart move if the area has experienced brain-drain, which is quite common effect of shrinking (Cortese et al., 2014; Galster, 2019; Joo & Seo, 2018; Rink et al., 2010). The current situation, where the population is getting older, which is happening in Finland generally (Kautto, 2004b, pp. 7, 11–12; Tilastokeskus, 2018b), is not handled anyway. There is the possibility that a land-use plan can't do anything to this, because it can offer things and create possibilities, but the plan cannot actually do anything to change population demographics. Also the idea to attract newcomers should also be accompanied by the idea that the outward flow of people should in general be stopped, not to try to get new people to the area, but to also to make the current population stay in the

area, this should perhaps be done first. The master plan cannot increase the number of children born in the area, so trying to attract newcomers of working age might be a good solution, but this possibly cannot stop the newcomers' children moving out of the city-region to go to university for example. For example larger cities with better service levels and higher education hubs attract people, there might be a risk that these service levels and educational needs cannot be created in the area or at least in some of the municipalities of the city-region (Florida, 2006; Kabisch & Haase, 2011).

6.2 Reactions to shrinking

What are the decisions made in the master plan compared to the situation in the city-region?

The strategic stage master plan is oriented towards growth, or as, the master plan's report states, prepared for growth (Ramboll Finland Oy, 2018b, pp. 60, 80). The master plans documents show little signs to actually adapt to the current trend of population shrinking, which has been in a long-term decline in the city-region. The Statistics Finland official population prediction shows a very different population trend than the master plans chosen common solution (figure 15). Also the population development from 1987 to 2017 show a very different pattern than the master plan predicts. The population of the figure for the master plan is very optimistic and does not even follow the more subtle predictions of regional plan's predictions for 2015-2030 and the newer prediction for 2040. These two predictions show a certain type of trend. The earlier prediction for 2015-2030 had a higher amount of population predicted than the newer prediction for 2040. As time passes and the trend of losing population continues the predictions are adjusted, but are still growth-oriented. Even though the master plan's population and job predictions are described as preparation for population growth not as actual goal of the plan, the preparation is contrary to the predictions. The amount of which jobs would grow by 2040 is 25 000 jobs, which means that the area would have a total of 55 000 jobs during that time. But as a plan's goal the master plan also takes into account that if growth does not happen as expected the city-region would be realized in such an order that the city-region would stay attractive. The population predictions requires according to the master plan's report, a high level of co-operation between the public sector and private sector (Ramboll Finland Oy, 2018b, p. 79).

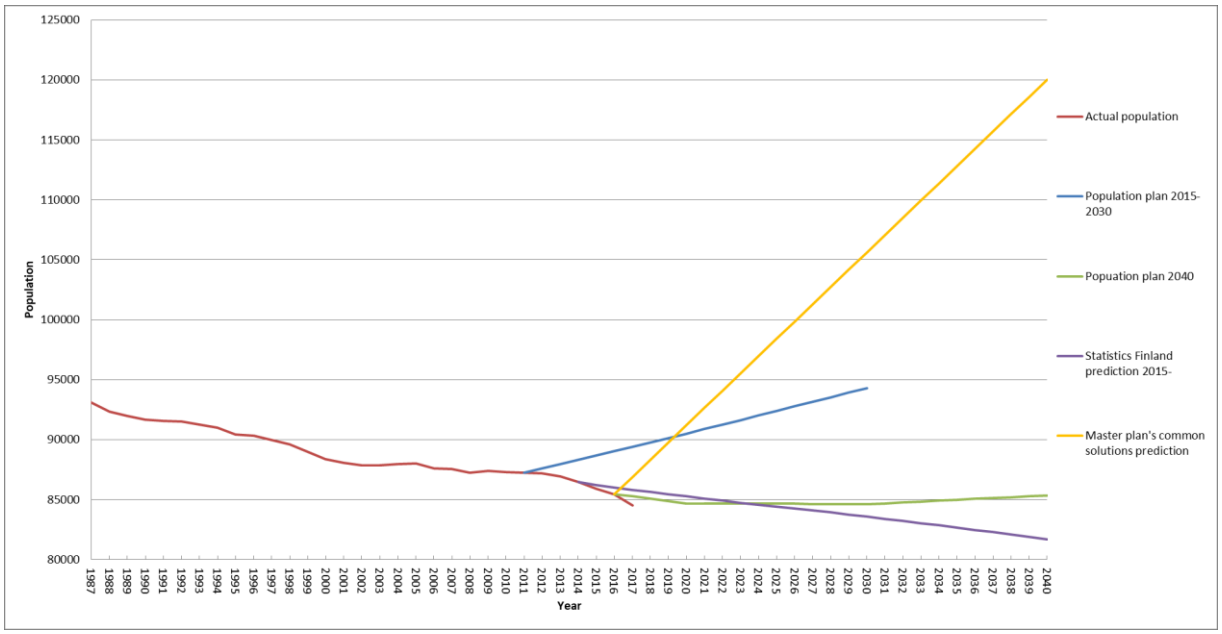

Figure 15. Combination of actual population in the area, different population predictions and the master plan's prediction (Ramboll Finland Oy, 2018b; Tilastokeskus, 2015, 2018a).

Why is the plan prepared for growth then? There are a few possibilities that came to mind, firstly the mismatch might come from a simple mistake, where a wrong number is forgotten in the plan. This is because planning processes are long, complicated and the plan changes a lot. But in this case such a mistake seems quite unlikely. Secondly the population growth is predicted in another document that has been used as a base for this master plan. This prediction might be completely separated from land-use planning. The third and final reason might be that because admitting shrinking is politically a sensitive subject and getting backing for this sort of plan could be complicated to get, it is on purpose planned for growth. There could be two goals to this, either a sort of deception, where a growing future is presented, but actually the plan works for another outcome, or to convince possible investors in a positive future. The last reason is that it is just a vision of the future, which might never become a reality. What must be remembered is that this plan represents a certain reality, which might not be true, there are a lot of things that are related to this plan, which cannot be seen. Reality is far more complex than this plan.

The area has lost jobs in certain sectors, like the ones that are related to the paper industry. Agriculture and forestry related jobs have been lost in the city-region, but there is no response to this. Perhaps this is done by intention. This may be done so that the area does not try to get back the same jobs that it had, but it will try to create new in different sectors. The master plan tries to create opportunities for the future and tries to create a direction which is in line with what strategic land-use planning is seen to be (Albrechts, 2004; Albrechts & Balducci, 2013; Faludi, 2000). The master plan does not restrict different outcomes in the city-region.

If the master plan is not meant to be read as an area reservation plan, why does the master plan then have area reservation symbols? The master plan is a hybrid type of plan, it uses strategic symbols and markings to guide long term actions, but it also draws lines, even if the lines are not meant to be read as for example area reservations. The master plan is not as detailed as it could be, but some municipalities in the city-region hoped that the master plan would guide detailed land-use planning directly. This need or want for more detailed

master planning that can be utilized later in more detailed planning is common in Finland (Ympäristöministeriö, 2014, pp. 36–37).

The municipalities in the city-region are shrinking differently, which is because of local factors (Hoekveld, 2012; Hoekveld & Bontje, 2016). The master plan puts emphasis on the more densely populated areas and also to the areas that have more workplaces. The idea is to densify the urban areas and then to expand. This means that the rural areas are to be left with less than the denser areas near the E18-route. The master plan's report states that these rural areas will be kept alive, but the reality could be very different. The changes that the area is facing in terms of employment are similar in all of the municipalities, but the reaction to this is different in the way that the areas near the E18 get more than the areas further away from the E18. For jobs this can be a good thing because GIS-data shows that jobs are concentrating near municipal centers. Also thinking at a more general level the master plan tries to improve the areas that that are faring better, which can be seen as a rational decision. But this is unfortunate for the rural areas.

The master plan does not effectively handle the city-regions change towards inter-municipal commuting, nor does it do anything to the losses of self-employment. Probably the master plan cannot do anything about the losses of self-employment. But the plan has a vision of providing new livable areas to the newcomers of the area and at the same time it puts emphasis on older areas and the densification of these areas. The master plan does not solve the problem of commuting and decencies because of commuting between municipalities. Also the master plan has a somewhat odd emphasis on travel and related services. These travel related services could be related to the border with Russia. The master plan can of coarse create opportunities for this kind of tourism, but is there a need for it? If looking at the border area, it has gained a lot of jobs, but if reflecting at the situation of Russia, it would seem uncertain to put trust in the location near Russia. The area has a different view of its location depending on the location of the municipality. It seems that the municipalities near Russia are more interested in the idea of using the vicinity to Russia as an advantage, while Pyhtää is identified being close to Helsinki.

The master plan, moves away from what the area used to be in terms of industry. There has been a shift in the structure of the fields of work, especially in agriculture and forestry, and industry, which can be seen happening in many places (Haase et al., 2016; Rink et al., 2010). The overall plan implies that new industry that differs from the past is wanted to the city-region, but then the legally binding master plan map does not so efficiently promote this same image of the future. The master plan is enabling towards industry and this could be understood that everything and one is welcomed. Very little restrictions are set by the master plan. If the situation does not develop as the municipalities want, will the municipalities then stretch the rules to get anything that the municipalities can get? The overall plan does create identities for these industrial areas, but these are not legally binding, is this a decision that is originally seen as a good one? This does not limit something even newer, but it does not limit the municipalities from taking anything and not striving for a new future with alternative industry.

As an interesting view, the area has an increase in elderly people and the healthcare sector has gained new jobs and is the largest sector of work in the area. Some grids in the area, that have grown much, are most possibly retirement homes. Understandably there are only few grids that see this kind of behavior, but the phenomenon still exists. This need for

elderly services is common in shrinking cities (Rink et al., 2010). But the master plan does not deal with this, or it is not mentioned in the master plan. The percentage of elderly people in Finland will continue to grow, most likely this trend will also continue in the city-region also even if the population will start to increase. This might not be the correct level of planning to solve this problem, but this problem still exists. Also the GIS-data shows that growing grids differ from shrinking grids in demographics, but the entire area is in general getting older.

6.3 The master plan as a tool

Is the selected planning tool capable of dealing with shrinking that the city-region has been faced with?

Understandably because of the type of land-use plan that the strategic stage master plan is, it cannot give detail about how the areas that are not gaining inhabitants should be handled, meaning that what happens to the possible deserted houses and other buildings in these areas. The master plan does guide development to certain areas, but says little about what would happen to the areas outside these main areas, but because of the scale of the plan, this would probably be taken care of on a different level of planning. The direction of which the master plan guides development is into the vicinity of the E18-route and to the main habited central areas. This is a strategic choice, but this makes the other areas, the more rural areas, that have lost workplaces and habitation into a situation that these areas will quite probably shrink even more.

The master plan is characterized as a tool of marketing. It highlights what could be in the area and it works with other documents that have been created previously. As a marketing tool, the local development company, Cursor, can use the plan to advertise what the area has to offer for investors. The master plan tries to enable quicker processes for possible new investors. The economic aspect is to respond to the shrinking that the area is experiencing. But this is not a clear break from typical planning solutions to shrinking. Economic growth is often seen as an answer for shrinking commonly. (Hollander et al., 2009; Knoop, 2014; Schatz, 2017) The master plan itself is a continuum of the development scheme, which was not legally binding. The master plan also utilizes the regional plan, which has been evaluated and updated in certain parts. Also the economic development strategy has a strong vision of the future and sets ideas for the city-region. The master plan's overall plan has profiling markings, which try to create differences in identities in the area, which can be understood as a marketing tool also. Because the master plan is part of a larger set of municipal and city-regional decisions it cannot be different from these according to the interviewed planners. Because of this it is enabling towards growth, but according to interviews growth is not needed. If this is the case the master plan then guides the development of the city-region towards perhaps something that could work better than the current structure. It perhaps tries to guide land-use towards a more dense solution, industry towards renewal and transportation to a better working network. If growth is not needed for the master plan to be implemented then the master plan guides the structure of the city-region towards a shrinking solution, and if the usage of the implementation plan is smart, this could be an interesting method to control growth and shrinking. The idea differs in this way from the basic idea that planning is aimed towards growth (Galster, 2019; Molotch, 1976; Popper & Popper, 2002; Rajaniemi, 2006), this plan possibly could work in other circumstances. But the master plan still uses for example

growth direction arrows, it does not display for example shrinking arrows or other symbols to show where the area could shrink.

The master plan is a combination of binding and non-binding markings. Because of this the master plan guides the land-use and the development of the area in two ways. Firstly it creates the legally binding structure for the city-region. Secondly it creates a vision of the area in the form of the legally non-binding markings. The master plan works then on two levels, it creates a legal base for the development of the area and also introduces a vision for the future, something to strive towards to. The master plan seems to work with statutory land-use planning and it still has strategic elements. The development scheme that was drafted earlier is a strategic plan, while the master plan is a plan that combines the statutory elements with strategic elements. This seems to follow what Mäntysalo et al. (2014, pp. 9, 14–15) suggest and this does create complexity as can be seen in the plan. But because the non-binding markings are not legally binding, there is the possibility to change the future and this can be a good thing or a bad thing. The legally binding part does restrict what can be done in the area, but not much. But this of course causes uncertainty, something that should be avoided in land-use planning.

As an instrument of planning a stage master plan replaces previous master plans with its themes in this case for example habitation, but in the case of this master plan this is not the case. The master plan map expresses that the strategic stage master plan does not replace previous sub-area master plans and that it would work with them existing on top of each other taking into account the master plans purpose.

The master plan's annex, the implementation plan is a tool to guide the implementation of the master plan. It will be updated periodically and it can respond to changes that the area faces, according to the interviews. The implementation plan is more flexible than the other documents, because it can react to the development of the area more easily. As a tool for making the master plan into reality, the implementation plan has potential, if used correctly, it can react to changes quickly. This makes updating the plan easier, the implementation plan removes the need for redrawing the entire plan, but this does not solve larger updating needs as the master plan is still a static map (Van Den Broeck, 2013). The master plan is according to the documents a stage master plan, as such it should work with other master plans, but according to the master plan's report, the master plan works with the regional plan. Meaning that the regional plan guides aspects that are not covered in the master plan. The master plan is in a weird position in the Finnish land-use planning system. According to documents and interviews it is supposed to work in theory on two levels, firstly it should guide the land-use of the city-region with the regional plan, secondly it should work with existing master plans. There is also possibly a third level, where the master plan guides land-use on a municipal level, which some municipalities hoped for.

The master plan does not guide land-use in the rural areas. It could give orders related to rural areas to inhibit building in these areas, but it does not do it. This is possibly not a problem as the rural areas are losing population more effectively than the urban areas, but if the area is to grow, it is quite probable that someone would like to move to rural areas and this could create strain to the services of the area. This could cause sprawling and this again can cause shrinking (Reckien & Martinez-Fernandez, 2011; Rink et al., 2010).

There are some dangers in the master plan as a political entity. Firstly it is accepted in each of the municipalities separately. The possibility that the plan is not accepted existed and became reality. Pyhtää did not accept the master plan as a legally binding master plan. Secondly the implementation plan, which is an annex of the master plan, is also accepted separately in each municipality and it can be altered at any time. Because Pyhtää did not accept the master plan as a legally binding master plan, the implementation plan was also not accepted. This causes problems as the municipality does not then follow what are others in the city-region agreed to do. The decision can cause competition within the city-region and can possibly cause instability in the city-region. This decision can also question the unity of the city-region and transmit a signal that the area is not actually as united as the municipalities try to present. Reason for this is unclear, but as Van Den Broeck (2013) describes that processes have conflicts and outcomes may be uncertain because of this. Also because the master plan is accepted in each of the municipalities separately, the plan is also most likely implemented and interpreted differently from municipality to municipality. This could also be seen in the interviews, where different planners saw different views in how to plan could be used and how does it guide more accurate planning. There is a need for more unison guidance if the master plan is wanted to be implemented similarly in every municipality.

7 Conclusions

The Kotka-Hamina city-region represents an area in change. The industry of the area has lost a lot of jobs and so has the agriculture and forestry, on the other side healthcare related jobs are rising. The population of the area is shrinking and getting older. Why has this not been taken into account in the strategic stage master plan? The planning documents depict a growing area that will attract new inhabitants, workers and companies, and that will, at the same time, be a traveling destination. There is at least at the level of growth expectations a mismatch. In Hospers' (2014) four strategies to shrinking, the master plan could be associated with the second type of countering shrinkage. This is because of its growth expectations. But in a way in could partly also be categorized into the third type of strategies, of accepting. This is because it accepts, at least the physical master plan, that the rural areas are shrinking and the ribbon-like area near the E18-route should be focused on.

It is good that the municipalities in the city-region are working together. This master plan seems to be an effort to work together to solve a demanding situation. The master plan tries to create a future where the population of the area has grown and the shrinking has been countered. But what if the city-region's strength would be somewhere else than in travel and cleantech? The master plan does give possibilities that it can respond to different kinds of futures. The strategic stage master plan tries to create identity and flexibility for the solutions it represents. On a legal side it assigns areas for specific purposes, but on the non-legal side it creates identities for these areas. The strategic choices that have been chosen for the strategic stage master plan represent a certain future. But there is a possibility that the master plan does not possibly accept so many outcomes as it could. The decision that the master plan has to be approved separately in each municipality shows that these five municipalities are expected to be committed to the plan, but at the same time this presents a problem, what if one or more municipalities will not approve the plan, will this lessen its impact? In the end of 2018 Pyhtää did not approve the plan as a strategic stage master plan, but as a strategic land-use plan that does not as effectively guide land use and does not have legal consequences in accordance with the Finnish land-use planning system. Will this compromise the solution on some level? If Pyhtää is not part of this future that was designed by the five municipalities of the city-region, what is the future of Pyhtää and the four municipalities that are dedicated to the strategic stage master plan. If looking at the commute data, majority of the people of Pyhtää work in Kotka, so it might be said that the municipality has a dependency on Kotka.

The master plan as a stage master plan has a little bit weird position in the Finnish land use planning system in the area. The master plan addresses only certain topics, but on the entire city-regional scale. On the topics that are not addressed in the master plan the regional plan is in force. The Finnish land-use planning system works on a basis that a more detailed plan level replaces the less accurate plan when coming to force, meaning in this case that a master plan usually replaces a regional plan when coming to force. Because of the way that the master plan is designed to work, in certain areas the regional plan is in effect rather than the city-regional stage master plan. This could create confusion in certain cases and will always require an examination of the master plan and the regional plan together, in order to understand what orders are to be followed in an area.

A note regarding the feature in the Finnish land-use planning system that allows building a new building in a non-detailed planned area with only a building permit, if it is not inhibited by either a master plan or specified as an area requiring planning. This strategic

stage master plan does not prohibit it. (LUBA, 1999, 16 §) It was not assessed whether any of the other methods were in force in the area, but it is clear that this plan does not make a decision about building in rural areas. This master plan does not then prevent building in rural areas. Thus, in a way, it does not hinder sprawl. Also it could be stated that the Land Use and Building Act is not specific in how detailed planning should be handled in a shrinking situation. The Act requires that detailed planning should be kept up to date according to the development of the municipality, but in reality shrinking is hard to control using detailed planning; a more higher level of planning would be suitable for this. (LUBA, 1999, 51 §) The reform of the Land Use and Building Act has brought to discussion some interesting ideas about building in rural areas. A paper by the Finnish Ministry of the Environment suggested that in areas that have less pressure for building, meaning rural areas, the right to build would and could be given without a review of planning. But at the same time the paper asks what should be done with abandoned housing in shrinking areas, and the phenomenon of shrinking is identified as something that will happen throughout Finland. (Ympäristöministeriö, 2018a)

As Schatz (2017) suggests there should be more debate and research how to make shrinking related issues more acceptable in planning that is done in a growth-oriented world. Also there is the image problem as Schatz makes clear, documents that are presented to the world, meaning that anyone reading them would give up on the desire to grow. Why would someone or a company move to an area that has "lost all hope" when this is even depicted in their planning documents? This image could scare away people and companies. This image problem can be seen also in Finland, where municipal mayors denied that their municipalities are shrinking and it is just a phase that the municipality is going through. (Rajaniemi, 1997, p. 7) But there might also be a problem that is not yet researched. Is shrinking branded wrong? It is seen as a negative thing. Should it be something else? Further, is the problem such that planners do not have the tools and methods to plan for shrinking, but are forced to plan for growth? Are the planners creating deliberately something growth oriented because they are perhaps forced to do so by the politicians? How was this master plan actually made? The process described in the master plans documents is not very specific, thus this raises questions about whose vision for the future is represented. Transparency should be improved, might this vision be of a certain group and not actually the trained planners' vision of the future?

If growth on the city-regional level is wanted, this growth should be attempted with a shared strategy. This includes planning of built areas, transportation and a shared city-regional service network. This also means giving up on a vision of growth of a single municipality and that the city-region must be seen as a whole, not just a collection of municipalities. Often in Finland this is problematic, because these single municipalities see their own development more important than the city-region's. This can be seen for example in the competition for inhabitants. Because of the importance of city-regional planning, informal planning and political tools have been created, which have improved the situation of city-regional planning, but at the same time these are often legally non-binding. (Hytönen, 2016, p. 18; Mäntysalo & Kosonen, 2016, pp. 34–36; Puustinen et al., 2016, pp. 10–11) Hytönen (2016) suggests that in Finland a void exists between the state and municipalities in planning. Currently the Finnish planning system gives a lot of legal authority to municipalities to plan within their own administrative boundaries, and regional planning is powered by the municipalities - in some cases regional planning can be seen as a devise in the service of its constituent municipalities' desires. Neither the state's nor the

municipalities' interests are primary reflected in regional planning. The level of city-regional planning is not currently guided by a democratic system. (Hytönen, 2016, pp. 18, 23, 107)

How would strategic planning actually work, if the decisions were to deal with actual degrowth? The Kotka-Hamina city-region strategic stage master plan shows some ideas to deal with this. It targets the main habitation and workplaces to the areas that are denser. Strategic master planning could also be used to show which areas are to be left without development to secure services in the more vital areas. This could be done in stages and using similar tools as displayed in the Kotka-Hamina city-region strategic stage master plan for growth. Symbols showing which areas and possibly in what order are left outside the "border" could be used. This would represent a certain will and direction for the future. Of course a master plan cannot remove infrastructure, buildings and inhabitants, but it could make decisions on what is more and what is less important. Because the master plan is a higher level plan it will be realized through lower level plans in the form of more detailed master plans and detailed plans. But it is unclear how these more specific plans are suitable for guiding shrinking.

Polèse and Shearmur (2006) make a valid point when they discuss population decline in Canadian regions; the regions will probably still be inhabited in a future set a hundred years from now, but it is impossible to predict at what amount of population the regions will eventually find a new stable situation, where the population level does not change. Dresden in Germany is an interesting example of a shrinking city that has shrunk, is currently growing, but is expected to return to shrinking in the near future. In the time of shrinking the city planned for growth that did not happen. When the population stabilized the planning was directed towards further shrinking. In 2012 shrinking and growing exist near to each other. (Wiechmann & Pallagst, 2012) Shrinking does not mean automatically that an area will disappear. This will require a new kind of thinking model that accepts a lower population and sets goals for that kind of future. This might be a hard task, one that might be a taboo for politicians and planners. Growth cannot happen eternally, growth and degrowth are linked to each other. If planning is always directed towards growth and the expectation is that the area will grow, how is this related to reality? Some areas will have to go through the process of shrinking.

Is all planning actually always biased towards growth and does this also concern the tools of planning? Following Rajaniemi (1997, p. 34): is there a paradox that exists in land-use planning? How to plan for shrinking using tools that are designed for growth? (Rajaniemi, 1997, p. 34) More research is needed to understand how planning tools can be used in shrinking areas in different levels of detail. Countries like Finland, which are already facing shrinking and will face it in the future even more, will need to assess how land use planning tools work and whether these tools should be developed to work in both growing and shrinking environments. At which level of planning should these tools be used in shrinking areas and at which level would it be best to guide shrinking? The existing tools should be questioned and studied. More research is needed on how planning tools perform in shrinking areas.

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Appendix 1

1 Finnish land-use planning system

Because the case study is set in Finland, an overview of the Finnish land-use planning system is in place. The Finnish planning system is divided into three main levels of plans and above these planning levels there are the national land use guidelines. The government produces the land-use acts. The regional planning is approved by the regional council. The regional plan can encompass a number of smaller city-regions. The other levels are the municipal levels, which include master planning and detailed planning.

1.1 Planning and land use in Finland

The Finnish land-use planning system is part of the Scandinavian family of planning (Newman & Thornley, 1996, pp. 34–35). The Finnish land-use planning system is guided by the Finnish Land Use and Building Act (*Maankäyttö- ja rakennuslaki, MRL,* 132/1999). The Act has come into force in 1.1.2000, replacing the Building act (*Rakennuslaki*, 370/1958) from the year 1958. The Land Use and Building Act is supplemented with the Land Use and Building Decree (*Maankäyttö- ja rakennusasetus, MRA,* 895/1999), which gives more precise orders than the Land Use and Building Act. (LUBA, 1999; LUBD, 1999)

The main objective of the Land Use and Building Act is expressed in its first section. The purpose of the Act is to create preconditions for sustainable development (economically, socially, ecologically and culturally) and to create preconditions for a good living environment. Sustainable development is an objective and it is not directly a binding rule, but something that should be strived for. Also the precondition for a good living environment is something that is not defined in the Act, but it should still be an objective for planning. Enabling participation of everyone affected by the plan and the quality of the participatory process is also an objective in the Act. (Ekroos & Majamaa, 2015, pp. 18–19, 22; LUBA, 1999, 1 §) The Act's fifth section defines the objectives for land use planning. There are eleven main objectives, which include for example operating conditions for economy and advancing effective competition in economy, the economical aspects of urban structure and land use and the protection of natural beauty and cultural values. These objectives complement the first section of the Act and are above the different plan levels content requirements. (Ekroos & Majamaa, 2015, pp. 38–39; LUBA, 1999, 5 §)

The Finnish planning system is a four level system which has three levels of plans and above them are the National land use guidelines (*valtakunnalliset alueidenkäyttötavoitteet, VAT*). The lowest and most accurate level is the detailed plan (*asemakaava*), which is subjected to the higher master plan level (*yleiskaava*). At the highest and most general level is the regional plan (*maakuntakaava*). (Ekroos et al., 2018, p. 33; Ekroos & Majamaa, 2015, p. 36; LUBA, 1999) The Finnish planning system works in the way that the lower level plans supersede the higher level plans. When a binding lower level plan becomes effective the higher level plan is not effective anymore in the lower level plan area. The higher level plan is used as a guide when drafting lower level plans, also in the case that the lower level plan is altered. (Ekroos & Majamaa, 2015, pp. 207, 267) If looking legally only the state and municipalities have elected representatives currently. At regional planning level this does not exist currently and only the municipal and state level have

decision-makers that are elected formally, which in away represent the current power relation in Finland. (Hytönen, 2016, p. 18)

All of the three levels of plans can be drawn in stages and the regional plan and the master plan can be drawn also in sub-areas (LUBA, 1999, 27 §, 35 §, 50 §). These types of plans have the same legal effects as the regular versions of these plans (Ekroos & Majamaa, 2015, pp. 163, 223). The regional plan, master plan and detailed plan consists of a map, key to the symbols and written part of the regulations. A plan report is also required. In terms of legal consequences, the report is not part of the plan but it is an explanatory document that explains for example the plans objectives, the participatory process and data gathered, alternative solutions and assessment of their impacts. (Ekroos & Majamaa, 2015, pp. 182, 187, 249, 344; LUBA, 1999, 29 §, 40 §, 55 §)

1.2 National land use guidelines

The most recent version of the national land use guidelines came into effect on the 1st of April 2018, the guidelines were decided on the 14th of December 2017 by the Finnish Government. The current guidelines replaced the previous guideline from the year 2000 which was revised in 2008. The main purpose of the National land use guidelines is to ensure that matters of national importance are taken into account in regional and municipal planning and also in the actions of national authorities. (Valtioneuvosto, 2017)

The national land use guidelines consist of five main themes that have in altogether 17 objectives (Valtioneuvosto, 2017). These objectives must be taken into account in all planning levels so that these objectives' fulfillment is promoted (LUBA, 1999, 24 §). The regional plan has the most important part in the realization of the objectives, in which the objectives are made into regional planning solutions. The national land use guidelines include objectives about promotion of polycentric, well connected structure that encompasses the entire country, a low carbon and resource effective urban structure that relies primary on the existing structure. (Valtioneuvosto, 2017)

1.3 Regional plan

The highest plan level is the regional plan and at the same time it is the most general level of planning. The planning of a region is also guided by a regional scheme (*maakuntasuunnitelma*) and a regional development programme (*alueellinen kehittämisohjelma*). (Ekroos & Majamaa, 2015, pp. 36, 156) The regional plan is drafted by the regional council (*maakunnan liitto*), which is a joint municipal authority (*kuntayhtymä*), which all of the municipalities in the region must be members of. (LUBA, 1999, 26 §) It is also the responsibility of the regional council to keep the regional plan up to date and also to develop it (LUBA, 1999, 27 §). The regional plan presents the structure and the main principles of land use and it also designates the areas that are necessary for regional development (LUBA, 1999, 25 §). The regional plan realizes the national land use guidelines into area reservations and also fits together regional and local objectives with the national land use objectives. (Ekroos & Majamaa, 2015, p. 159) Regional plans guide lower level plans and the regional plan is used as a guideline when drafting and updating lower level plans. The regional plan is also to be used as a guideline in other cases when other sorts of measures are used to organize land use. (LUBA, 1999, 32 §)

The regional plan has content requirements that are specified in the 28 § of the Land Use and Building Act. These requirements are minimum requirements that are required for the

plan to be legally binding. (Ekroos & Majamaa, 2015, p. 166) These requirements include for example the requirement to appropriate structure of the area, the appropriate conditions for the region's business operations and sustainable ecological land use (LUBA, 1999, 28 §).

1.4 Master plan

Below the regional plan is the master plan that is drafted by the municipalities themselves (LUBA, 1999, 36 §). The main objective is to guide land use and the structure of a municipality and to integrate different functions. (Ekroos & Majamaa, 2015, p. 36) Master plans present the principles of the desired development and also indicate the areas needed for more detailed planning and development guidance (LUBA, 1999, 35 §). The municipality is also responsible for keeping the plan up to date and also for the approval of the plan, which is done by the municipal council (LUBA, 1999, 36 §, 37 §). How the master plan is kept up to date is flexible and there is no time limit in which time a master plan is out of date. (Ekroos & Majamaa, 2015, p. 225) As with the regional plan, the master plan guides land use for the lowest level plan, the detailed plan. The master plan conveys the regional plan's regional and national objectives to the detailed planning level. The master plan is also to be used as a guideline in other cases when other sorts of measures are used to organize land use. Commonly a newer master plan replaces the previous master plan, but it is also possible for the older plan to be kept partly in force. (Ekroos & Majamaa, 2015, pp. 266–267; LUBA, 1999, 42 §) Master plans are commonly used in growing and expanding areas where there is a need for guiding for example detailed planning, but it can be used also in areas that have no need for detailed planning. A master plan can be also used in shrinking areas to rethink the land use in these areas. (Salmi, 2006, p. 20) Master plans can also be drafted such that they do not have legal consequences in parts of the plan or the entire plan. If a master plan has no legal consequences it does not for example bind detailed planning and a detailed plan might be very different from the master plan in its area. In the case that a master plan that has no legal consequences is in force in an area for which detailed planning is being started, the binding plan in this case is the regional plan, and the detailed plan has to take into account the master plan's content requirements presented in 39 §. Also a master plan can have legal consequences only in parts of it. (Ekroos & Majamaa, 2015, pp. 286–287; LUBA, 1999, 45 §; Salmi, 2006, p. 13)

As with the regional plan, the master plan also has content requirements, which are specified in the 39 § of the Land Use and Building Act. These content requirements include utilization of the existing urban structure, the appropriate conditions for the municipality's business operations and the accessibility of services and the needs of housing. These are, as with the regional plan's requirements, the minimum requirements that are required for the plan to be legally binding. All of the nine requirements that are stated must be fulfilled for the plan to be legally binding; this forces the preparation of the plan to reach a reconciliation of these requirements. (Ekroos & Majamaa, 2015, pp. 233–234; LUBA, 1999, 39 §)

The master plan itself is usually presented as a map, which includes the map itself and the accompanying key to the symbols and the regulations in a written format. The master plan has typically a report attached to it. This report includes how the plan was made, with what information were the decisions made and how where these decisions assessed, how the plan will have an effect, how participation was done and other information typically with

annexes. The map with the key and regulations is the legal document. The map is to be presented on a scale, which is understandable taking into account the function of the master plan and it can also be presented on multiple maps. Master plans that guide building directly are more detailed than master plans that guide the structure of an entire municipality. The master plan's report is not actually even part of the plan, it is a separate document that has no legal consequences. The report can be used for making a complaint about a master plan to the Administrative Court, if for example the report shows that during the process of drafting the master plan, the effects of the master plan were not assessed to a proper level or other similar circumstances which prove that the master planning process was not done according to the law. (Ekroos & Majamaa, 2015, pp. 249, 254–256; LUBA, 1999, 40 §; LUBD, 1999, 16 §, 17 §)

1.5 Joint master plan

The Land Use and Building Act's 4 § states that master plans can be made mutually between municipalities. These plans are called joint master plans. For the Helsinki Metropolitan Area the Act's 46 a § states that a joint master plan should be produced, but this has not happened. (Ekroos & Majamaa, 2015, p. 293) The conditions for making a joint master plan are elaborated more in 47 § and 48 §. The joint master plan is guided by the regional plan, but the joint master plan can deviate from the regional plan. In this way the joint master plan has more power in inter-municipal solutions than a normal master plan. This also makes it possible for a joint municipal master plan to react faster to changes in an area than a regional plan. If the joint master plan deviates from the regional plan the joint master plan must be adaptable to the regional plan, it must not be totally incompatible. If the joint master plan deviates from the regional plan, it must take into account the content requirements that are specified for regional plans. (Ekroos & Majamaa, 2015, pp. 297–298; LUBA, 1999, 48 §; Salmi, 2006, p. 17) The main opportunities presented in this kind of master plan are the opportunity to negotiate and solve inter-municipal problems, or this kind of plan can solve questions in the border areas of two or more municipalities. This kind of plan can also be used to change guidance of areas, when the change in a regional plan is not seen as necessary, and it can in some situations replace the need for a municipality to have its own master plan. (Salmi, 2006, pp. 17–18)

The drafting of this kind of a master plan differs from a standard master plan, it is not supposed to be made so that every municipality has to prepare its own parts, taking into account inter-municipal questions, and then approving the plan. The municipalities can have the regional council or other joint municipal body to draft and approve the plan. The joint master plan is ratified by the Ministry of Environment and in the ratification process its correlation with the regional plan is observed. Joint master plans have been quite rare in Finland, the first was approved in 2005 in the Oulu city-region and covered five municipalities entirely and parts of a sixth municipality. (Ekroos & Majamaa, 2015, pp. 295–296; LUBA, 1999, 47 §; Ympäristöministeriö, 2014, pp. 31, 34) Commonly joint master plans in Finland have been drafted as sub-area master plans that cover two municipalities' mutual boundary areas (Ympäristöministeriö & Suomen ympäristökeskus, 2015). Usually joint master plans have been seen as difficult to be drafted and that the plans guidance with the regional plan is seen as confusing (Ympäristöministeriö, 2014, pp. 31, 34).

1.6 Other forms of master plans

Commonly master plans are a mix of different types of master plans (Salmi, 2006, p. 21). The Finnish Land Use and Building Act states that master plans can be drawn in stages and that they can also be drawn for sub-areas. Those drawn in stages can be thematically differentiated, meaning that a certain stage master plan for instance only have orders about transportation or energy solutions. If the master plan is drawn in stages it should be drafted so that it is not causing contradictions with other master plans that might be existing in the area previously. Also with this kind of stage master plan the land-use guidance should be as clear as possible. Stage master plans might cause problems as there might be the possibility that a master plan would only cause restrictions on landowners, without benefits, which is forbidden in the Land Use and Building Acts 39 §. (Ekroos & Majamaa, 2015, p. 223; LUBA, 1999, 35 §, 39 §; Salmi, 2006, p. 21)

There are also specific master plans for guiding development in shore areas, and wind power master plans. (LUBA, 1999, 72 §, 77 a §) A master plan's level of detail depends on the need of planning. A strategic master plan for example might depict changes and development goals selectively and in more abstract terms, while a master plan that guides development in a village might be very detailed in its presentation. The level of detail also depends on the area that the master plan covers; the larger area reservation plans covering an entire municipality might be more general than master plans covering a central area. The latter might be quite elaborate, to guide detailed planning. (Salmi, 2006, pp. 49–50)

1.7 Detailed plan

The most elaborate level of planning is the detailed plan. Its function is to guide the land use of a part of a municipality (Ekroos & Majamaa, 2015, p. 36). The detailed plan is approved by the municipality (LUBA, 1999, 52 §). The purpose is to organize land use and development in detail. The detailed plan designates areas for different purposes (Ekroos & Majamaa, 2015, p. 304; LUBA, 1999, 50 §). When the detailed plan is drawn it must take into account the regional plan and the legally binding master plan. If there is no legally binding master plan, the detailed plan must take into account what is required of the master plan in the content requirements. (LUBA, 1999, 54 §) A detailed plan can be drafted as not complying with the master plan, if the master plan is outdated. In that case the detailed plan must take into account the content requirements of the master plan (see LUBA, 1999, 39 §) and reach a planning solution that incorporates broader planning issues that are of concern in master planning. (LUBA, 1999, 42 §)

The detailed plan designates the required areas for different purposes according to, for example, the local conditions, cityscape and landscape (LUBA, 1999, 50 §). The Land Use and Building Act also states that development of the municipality requires that the detailed plans must be drawn and kept up to date. If a detailed plan is over 13 years old and it is significantly unimplemented, building permits may not be granted before it is assessed by the municipality whether it is out of date. This time period for assessing the validity of the detailed plan can be shortened to five years and extended to 20 years. The time period does not mean that automatically a detailed plan is required to be assessed, it should be assessed when a new development permit for the area is applied. (Ekroos & Majamaa, 2015, p. 380; LUBA, 1999, 51 §, 60 §) When assessing the development of the municipality, the Act states that the need for production of apartments and the promotion of effective competition in the municipality's economic life needs to be especially taken into account (LUBA, 1999, 51 §). Detailed plans have also content requirements. The requirements for

example include requirements about the amounts of parks and recreational areas, it must preserve natural and built environment and the detailed plan must not weaken anyone's living environment that is not justified by the detailed plan's purpose. (LUBA, 1999, 54 §)

The Land Use and Building Act is more specific in the presentation of the detailed plan than regional plan or master plan. In the detailed plan certain specific things must be presented on the map. These for example include the boundaries of the detailed plan, the boundaries between different areas and the amount of building right. (LUBA, 1999, 55 §) The detailed plan has legal consequences. A building cannot be built in violation of the detailed plan, a function that harms the use of a certain area may not be located in the area and functions that are in conflict with the regulations of the plan may not be located in the area. (Ekroos & Majamaa, 2015, pp. 371–372; LUBA, 1999, 58 §)

The Land Use and Building Act also specifies a plan type for shore areas known as the detailed shore plan and also detailed plans can be drawn for underground facilities. (LUBA, 1999, 56 §, 72 §)

1.8 Building permit

To build a building in Finland a building permit is needed (LUBA, 1999, 125 §). In detailed planned areas there are certain criteria that must be fulfilled, in order to get the building permit. The first criterion is related to detailed planning, so that the building project is in accordance with the detailed plan. The other criterions are not related to planning directly. (LUBA, 1999, 135 §) Outside detailed planned areas, the Finnish land-use planning system has this interesting feature that allows building of a new building in a non-detailed planned area with only a building permit, if it is not inhibited by either a master plan that has legal consequences, specified as an area requiring planning or prohibited otherwise in a municipal building ordinance. In certain very specific conditions a regional plan can also inhibit building, but this only applies for example to nature protection areas and transportation areas. (Ekroos & Majamaa, 2015, pp. 876–877; LUBA, 1999, 16 §, 30 §, 33 §, 136 §; Pihala, 2004, pp. 11–16) In Finnish context this is unofficially called the basic building right (*perusrakennusoikeus*). This right existed already during the previous Building act that preceded the Land Use and Building Act. Similar rights have existed in other Nordic countries, but this has been abandoned. (COMMIN, 2007; Helsingin seutukaavaliitto, 1990, pp. 7, 12) The right to build comes from the Finnish Constitution, where it is not directly mentioned. Also the Finnish Constitution has the basic right that everybody should be treated equally, which in land use means that if one is allowed to build, everybody in similar circumstances should be allowed to build, too. (Uudenmaan liitto, 2012, p. 11) The Land Use and Building Act in 116 § sets the minimum requirements for building (LUBA, 1999, 116 §). The municipality can set specific requirements for this than are stated in the act (Ekroos & Majamaa, 2015, pp. 740–741).

1.9 Planning process

The planning process is similar in all three levels of planning. The basic structure of planning can be separated to four parts that are starting phase, preparation phase, proposal phase and approval phase, and the process happens in this order. The planning process starts with the evaluation of the need for planning. Also in this starting phase the preliminary programming of planning and the participation and assessment scheme is drafted. In the preparation phase generally a draft of the plan and its' other documentation

is presented to the public. The preparation phase is followed by the proposal phase, in which the feedback received from the draft from the public and statements from the authorities is used to shape the plan. In the proposal phase a proposal of the plan is presented to the public, during the time the plan is on display the public can make objections to the plan. Also during this time authorities can make statements of the plan. If the plan is significantly changed because of these objections or statements the plan needs to be set on display again. The approval phase is the final phase in which the plan is approved either by the municipality in the case of detailed plans and master plans or by the regional council in the case of the regional plans. After the approval the plan can be appealed to the Regional Administrative Court and even after that to the Supreme Administrative Court. If the plan is not appealed to the courts, or if the courts rule in favor of the plan, the plan is ratified and it is legally binding. (Heikkonen & Irjala, 2002, pp. 12–13; LUBA, 1999, 31 §, 37 §, 52 §, 63 §; Tulkki & Vehmas, 2007, pp. 17–19)

1.10 Reform of the Land Use and Building Act

Currently a reform of the Land Use and Building Act is underway. The current Act has come into force in the beginning of the year 2000 and during its time in force about two-thirds of it has been altered, added or removed. One of the main goals of the reform is to simplify the land use planning system. Currently the goal is that the reform will be finished by the end of 2021. (Ympäristöministeriö, 2018b, 2019) The society and the world have changed during the time the Act has been in force. These changes are forcing a larger change that must also be addressed in the Act. (Ekroos et al., 2018, pp. 11, 13–18) The latest reports suggest that the renewed planning system should have two planning levels. A higher level general plan would be drafted for larger areas, namely major city-regions, and it would be strategic in nature. A lower level plan would replace the current municipal master plan and detailed plan. The lower level plan would operate on municipal level and it would be scalable in detail and size depending on the planning case at hand. (Ekroos et al., 2018; Ympäristöministeriö, 2018a)